An historical and ecological study of inclosed and uninclosed woods in the New Forest, Hampshire.

Flower, Nicholas

Abstract of the Survey of the Timber standing in in the New Forest, taken under the Inspection of Jno. Nichols Surveyor and Henry Tombes Deputy Surveyor by Order of the House of Commons to John Pitt Esqr Surveyor General of His Majestys Woods — The Survey was finished the 25th May 1783

Oak Timber and Knees	Loads	Loads
Number of Knees from 7½ Feet and upwards with the Quantity of Timber they contain Square Measure, all fit for the use of the Navy	12428	5980
Trees from 16 Feet Square Measure and upwards which had done growing and fit to cut for the use of the Navy	10680	23311
Trees which were growing from 45 Feet and upwards fit for the use of the Navy	18181	23632
Total fit for the Navy — £ s d	41792	52913
The above Timber worth 176376.13.4		
Growing Trees from 7½ Feet to 45 Worth — £ 135716.0.0	19390	5816½
Trees from 15 Feet to 45 fit to cut Worth £ 5620.0.0	3838	2218
Dotard and defective Trees from 10 Feet and Upwards Worth — 3158.13.4	2067	2569

The smallest Piece of rough Oak Timber received at the Dock yards is 45 Feet Content Square or Caliber Measure, and the smallest Knee 7½ Feet, the Survey, therefore, was taken in conformity to the same

Beech Timber	Loads	Loads
Trees from 60 Feet and Upwards fit to cut £ Worth — 15780	3916	9468
Growing Trees from 10 Feet and Upwards £ s d Worth 43654.6.8	15516	37418
Scrubbed or Defective Trees from 10 Feet and Upwards for Sales Repairs or Fuel £ Wood Worth — 1680	4774	3 —

General Abstract Oak	Worth £	s	d	Loads	Loads
Fit for the Navy	176376	13	4	41792	52913
Growing Trees from 7½ Feet to 45	135716	0	0	19390	5816½
Trees fit to cut from 15 Feet to 45	5620	0	0	3838	2218
Dotard and defective Trees from 10 Feet and Upwards	3158	13	4	2067	2569
Total of Oak	320871	6	8	24160	11589½
Beech	61034	6	8	10717½	36886
Total	381905	13	4	34877	152780

N.B. The Survey was taken in girt or round Measure, This Abstract is given in Square Measure

An Account of the Quantity of Oak Timber which was standing in the County of Hampshire fit for His Majesty's Navy, including that which was on private Estates as well as the Kings Forests; from an actual Survey taken in the Forests in 1783 and an Estimate made of what was on private Estates in 1786.

Places where standing	Loads
New Forest	52913
Alice holt and Woolmer Forest	10818
Bear Forest	229
Private Estates	47900
Total	111860

And there is an immense Quantity of young Trees in the County in succession

Thos Nichols

In Rockingham Forest in Northamptonshire only, there are 110,000 Loads of Oak fit for the Navy; this Account is given by Mr Slade Surveyor of Deptford Dock-yard

An Account of Oak and Beech Timber felled in the New Forest for the use of the Navy since the Survey in 1783 Distinguishing the Quantity in each year

year	Oak							Beech						
	Number of Oak Trees and Quantity in Loads felled for the Navy		Defective Trees refused on Survey		Sent to the Dock yard for the Navy			Number of Beech Trees and Quantity in Loads felled for the Navy		Defective Trees refused on Survey		Sent to the Dock for the Navy		
	Trees	Loads	Trees	Loads	Trees	Loads	Abate Loads	Trees	Loads	Trees	Loads	Trees	Loads	Abate Loads
1783	580	1128	48	86	532	1042	55	104	280	4	8	100	272	1
1784	1458	2738	69	102	1389	2636	94	293	700	10	17	283	683	12
1785	529	989	59	81	470	908	51	119	298	5	11	114	287	4
1786	1178	2162	125	189	1053	1973	63	108	280	2	4	106	276	2
1787	832	1526	101	159	731	1367	67	108	234	1	1	107	233	2
1788	563	1083	45	69	518	1014	36	79	138	"	"	79	138	1
1789	627	1140	46	65	581	1075	40	"	"	"	"	"	"	"
1790	658	1165	31	53	627	1112	33	109	215	"	"	109	215	2
1791	579	1073	57	72	522	961	40	"	"	"	"	"	"	"
Total	7004	13004	581	876	6423	12088	479	920	2146	22	41	898	2104	24

The whole Quantity of Oak Timber felled in the Forest for the Navy, from the year 1783 to 1791 inclusive, has been 7004 Trees containing one, with another 92 Feet or the Whole taken together 13004 Loads, the yearly Average of which is 1778 Trees containing 1444 Loads, which, after deducting the Quantity refused for defects, and the Abatements, there appears to have been delivered at the Dock yard 6423 Trees containing 11609 Loads, or on an Average yearly, 713 Trees containing 1289 Loads — In the same time there have also been 920 Beeches containing 2145 Loads felled for the Navy, and delivered to the Dock yard of that Quantity 898 Trees containing 2080 Loads, the Abatements deducted — And there are 617 Oaks containing by estimation 1051 Loads selected and marked in the Trees and a Return made of them to the Surveyor General, for the use of the Navy in the year 1792 together with 83 Beeches containing 212 Loads — So that in the Course of 10 years including 1792 there will have been no less than 7621 Oak Trees containing 14055 Loads appropriated for the use of the Navy from the Forest,

Jno. Nichols Surveyor

Fig. 28 The New Forest (1968)

enclosed freehold and Crown agricultural holdings

silvicultural inclosures

unenclosed woodland

New Forest perambulation

area of fig 21

woodland sites **1 - 24**

N

SOUTHAMPTON

Hale Purlieu

Plaitford Common

Millersford Bottom

Black Gutter Bottom

Bramshaw Wood

Furzley Common

Bramshaw

Longcross Plain

Eyeworth Wood

Fritham

Fritham Plain

Hampton Ridge

Frogham

Latchmore Bottom

Anses Wood

Shave Wood

Ocknell Plain

Minstead

Broomy Plain

Ibsley Common

Linwood

Bratley Plain

Rockford Common

Red Shoot Wood

Pinnick Wood

Bratley Wood

Mark Ash Wood

Ashurst Wood

Matley Heath

Matley Wood

Lyndhurst

Backley Plain

Berry Wood

Gritnam Wood

Whitley Wood

Denny Wood

Yew Tree Heath

Denny Bog

Hollands Wood

Tantany Wood

Frame Wood

Stubbs Wood

Hardley

Burley

Cranes Moor

Goatspen Plain

Hinchelsea Moor

Brockenhurst

Beaulieu

Beaulieu Heath

Thorney Hill Holms

1 2 3 4 5 Miles

Table 6. Ordination Matrix (coefficients of community top right, interstand distances bottom left)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	....	30.5	32.3	15.2	26.1	37.5	7.0	10.0	33.0	15.1	3.5	19.0	30.4	14.0	23.2	39.3	34.3	14.2	31.7	65.8	36.2	10.0	25.5	36.8	1
2	69.5	....	8.4	31.4	28.0	10.0	4.4	12.5	44.8	31.4	0.9	19.8	89.9	35.4	33.5	58.0	30.0	17.5	31.4	55.0	25.6	31.4	31.4	31.4	2
3	67.7	91.6	....	22.9	13.0	48.4	56.6	36.8	17.6	50.1	28.1	36.8	10.1	35.7	16.1	19.5	40.6	26.5	44.0	8.9	14.1	27.0	24.2	41.2	3
4	84.8	68.6	77.1	....	8.8	16.7	21.5	33.4	28.0	63.8	14.2	31.7	24.6	58.9	49.6	67.1	40.5	38.3	76.4	35.9	31.8	76.6	61.7	71.1	4
5	73.9	72.0	87.0	91.2	....	16.3	14.5	28.6	35.8	10.8	4.1	17.8	31.3	8.0	6.1	30.7	7.6	28.9	4.1	24.6	4.1	4.1	14.3	7.2	5
6	62.5	90.0	51.6	83.3	83.7	....	31.3	39.0	20.3	16.8	62.9	39.1	12.8	55.0	16.9	27.3	31.3	24.6	32.0	16.4	6.8	19.7	18.0	31.7	6
7	93.0	95.6	43.4	78.5	85.5	68.7	....	36.1	15.7	38.8	28.8	34.9	7.7	32.4	12.1	15.5	14.9	25.1	17.5	4.9	10.7	23.5	12.4	17.6	7
8	90.0	87.5	63.2	66.6	71.4	61.0	63.9	....	24.2	23.6	36.5	69.6	15.8	48.1	20.2	23.6	23.0	58.4	25.6	13.0	18.7	31.6	31.1	25.7	8
9	67.0	55.2	82.4	72.0	64.2	79.7	84.3	75.8	....	23.8	8.4	31.5	48.1	27.8	25.8	50.4	26.8	28.0	23.8	40.4	22.5	23.8	24.8	26.9	9
10	84.9	68.6	49.9	36.2	89.2	83.2	61.2	76.4	76.2	....	12.0	21.9	21.4	56.7	54.6	68.8	39.6	32.8	63.8	41.0	31.8	63.8	38.3	52.1	10
11	96.5	99.1	71.9	85.8	95.9	37.1	71.2	63.5	91.6	68.0	....	27.6	0.9	51.3	8.5	11.9	7.9	17.8	14.0	1.4	7.1	20.0	5.1	10.9	11
12	81.0	80.2	63.2	68.3	82.2	60.9	65.1	30.4	68.5	73.1	72.4	....	23.1	41.5	20.5	30.9	21.3	36.9	23.9	20.4	17.1	29.9	23.9	24.0	12
13	69.6	10.1	89.9	75.4	68.7	87.2	92.3	84.2	51.9	78.6	99.1	76.9	....	25.3	23.4	48.0	24.6	20.7	21.4	44.9	21.4	21.4	24.6	24.5	13
14	86.0	64.6	64.3	41.1	92.0	45.0	67.6	51.9	72.2	43.3	48.7	58.5	74.7	....	51.6	60.6	37.0	34.4	58.7	39.9	31.8	64.7	38.3	52.1	14
15	76.8	66.5	83.9	50.4	93.9	83.1	87.9	79.8	74.2	45.4	91.5	79.5	76.6	48.4	....	57.9	39.6	29.3	49.6	43.9	31.8	49.6	38.3	49.6	15
16	60.7	42.0	80.5	32.9	69.3	72.7	84.5	76.4	49.6	31.2	88.1	69.1	52.0	39.4	42.1	....	39.6	32.7	67.1	65.4	31.8	67.1	38.3	52.1	16
17	65.7	70.0	59.4	59.5	92.4	68.7	85.1	77.0	73.2	60.4	92.1	78.7	75.4	63.0	60.4	60.4	....	30.5	60.1	33.0	31.8	37.0	48.0	61.8	17
18	85.8	82.5	73.5	61.7	71.1	75.4	74.9	41.6	72.0	67.2	82.2	63.1	79.3	65.6	70.7	67.3	69.5	....	30.6	22.2	23.6	34.4	36.0	30.6	18
19	68.3	68.6	56.0	23.6	95.9	68.0	82.5	74.4	76.2	36.2	86.0	76.1	78.6	41.3	50.4	32.9	39.9	69.4	....	35.9	31.8	77.0	48.6	73.6	19
20	34.2	45.0	91.1	64.1	75.4	83.6	95.1	87.0	59.6	59.0	98.6	79.6	55.1	60.1	56.1	34.6	67.0	77.8	64.1	....	52.3	35.9	34.6	35.9	20
21	63.8	74.4	85.9	68.2	95.9	93.2	89.3	81.3	77.5	68.2	92.9	82.9	78.6	68.2	68.2	68.2	68.2	76.4	68.2	47.7	....	31.8	29.8	31.8	21
22	90.0	68.6	73.0	23.4	95.9	80.3	76.5	68.4	76.2	36.2	80.0	70.1	78.6	35.3	50.4	32.9	63.0	65.6	23.0	64.1	68.2	....	38.3	52.1	22
23	74.5	68.6	75.8	38.3	85.7	82.0	87.6	68.9	75.2	61.7	94.9	76.1	75.4	61.7	61.7	61.7	52.0	64.0	51.4	65.4	70.2	61.7	....	75.0	23
24	63.2	68.6	58.8	28.9	92.8	68.3	82.4	74.3	73.1	47.9	89.1	76.0	75.5	47.9	50.4	47.9	38.2	69.4	26.4	64.1	68.2	47.9	25.0	....	24
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

An Historical and Ecological Study of Inclosed and Uninclosed Woods in the New Forest, Hampshire

Nicholas Flower

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Fig.1 Pinnick Wood, oak coppice relic (SU197078)
Discussed on page 72.

SUMMARY

In Part I, new documentary evidence is presented of woodland management in the New Forest, from 1400 to 1800. From the detailed information about rates of timber extraction and its uses, and from timber surveys carried out in the 16th, 17th and 18th centuries, it has been possible to reconstruct changes in woodland management policy and methods over the last 400 years.

From the time of William I to the late 15th century, the Forest was managed as a royal hunting preserve. Declining interest in the chase, and the need for timber for the construction of a permanent Navy, brought increasing exploitation of the timber resources of the Forest through the growth of the coppice system. (Detailed historical and geographical information on coppices and early inclosures is presented.) The end of coppicing, brought about by still greater demands for Navy timber for the wars of the 17th and 18th centuries, resulted in the third management phase: the exploitation of suitable sites in the Forest for the exclusive production of oak timber. The introduction of iron hull construction, and the consequent fall in demand for oak, brought about the final phase: the exploitation of the Forest, in the late 19th and 20th centuries, for maximum yield in the form of conifers.

In Part II, methods and results are presented of a program of random sampling and phytosociological ordination of 24 woods in the Forest. The results provide, not only a classification and characterization of the woodland types sampled, but also contemporary evidence in support of many of the historical changes discussed in Part I.

The ordination clearly differentiates the primary and secondary nature of the various woods. The ecological significance and history of individual woods is discussed. Analysis of age structure confirms the existence, during the last 350 years, of four widespread phases of regeneration in the uninclosed woods, and the steady shift, over the same period, from oak dominance to the present state of parity between oak and beech.

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Foreword

The importance of the New Forest cannot be exaggerated. Quite apart from its aesthetic value, it is of exceptional interest to scientists in many fields. In the lowlands of north-western Europe, small blocks of ancient deciduous woodland survive on old estates and in remote corners, but only in the New Forest has so much primary woodland survived.

The importance of these woods lies in their ecological continuity. Such woods have not remained undisturbed throughout their history, as the present work will show, but having escaped serious modification, they retain ecological links with the forest of prehistory. The importance of this continuity is demonstrable, not only from the characteristics of the Forest canopy, but from the unique range of flora and fauna which has also survived.

The ability to predict the future behaviour of such woods is vital to their long-term survival in an age of increasing pressure from all quarters; but such predictions can only be based on an understanding of the past.

In the course of previous research into the soils of the heathlands and uninclosed woodlands in the Forest, I became aware of the difficulties in the interpretation of present-day evidence, with only limited historical background. It was clear that without an historical basis, detailed quantitative work, while being of some descriptive value, could not give satisfactory answers to developmental questions. It was also clear, from the few documents known in 1973, that an adequate background to the management of the Forest could not be provided without the discovery of further evidence. The first part of this thesis contains new material brought to light by my searches in the Public Record Offices in London and Winchester.

PART I

INTRODUCTION

The New Forest occupies a naturally circumscribed area within the Hampshire Basin, bounded to the east by Southampton Water, to the south by the coast, and to the west by the Avon valley.

Geology

The Hampshire Basin syncline is formed of Tertiary deposits overlying the Cretaceous chalk beds found at the surface on Salisbury Plain to the north, the Dorset Downs to the west and north-west, and the Isle of Wight to the south. The Tertiary layers are in turn overlain by Pleistocene superficial deposits. Periglacial conditions in the past have spread, mixed and eroded the surface deposits. The effects of late-glacial water-working, and erosion caused by deforestation by early man in many parts of the Forest, have combined to leave a confused variety of parent materials.

Era	System	Formation	Type of material	Thickness (max. metres)
Quaternary	Pleistocene	Valley Gravel	Clay gravel mixtures	1-3
		Plateau Gravel	Stony gravel, may be pure flint	1-3
Tertiary	Oligocene	Headon Beds	Mostly clays, often with shell fragments	30
	Eocene	Barton Sand	Sands and loams	25-30
		Barton Clay	Mostly clays	35-45
		Bracklesham Beds	Mostly clays, but also sand and loam	60
		Bagshot Sand	Sands with some loam	60

Topography

The Tertiary strata of the Hampshire Basin, being mostly soft sands and clays, have been eroded to produce a distinctive topography. Much of the New Forest consists of flat-topped plateaux and terraces covered with Plateau Gravel and intersected by numerous stream valleys.

The altitudinal range of the Forest is from 25 to 450 feet above mean sea level, with most areas lying between 100 and 200 feet. Slopes are generally gentle, rarely exceeding 5^{o}.

Climate

There are no meteorological stations within the Forest perambulation, but there are four close by: two on the east side and two on the west. The mean monthly rainfall figures for the four stations at Ringwood, Fordingbridge, Romsey and Southampton are as follows (millimetres):

Jan.	89.4	May	51.6	Sep.	64.5
Feb.	60.2	Jun.	43.9	Oct.	86.1
Mar.	54.1	Jul.	61.5	Nov.	96.0
Apr.	55.1	Aug.	65.8	Dec.	88.9

Mean annual total 817.6

(Meteorological Office rainfall averages, 1916 - 1950)

There is marked seasonal variation in rainfall, and for the five months April to August, evapotranspiration exceeds rainfall, producing very dry conditions in late summer.

Although there have been exceptional winters such as 1962-3, low temperatures are rarely recorded within the Forest. On average, snow lies for less than five days in the year. The average daily mean temperature for February, the coldest month, is $2.5^{o}C$; a minimum daily temperature below $0^{o}C$ occurs, on average, during 35 days in the year.

1. HISTORY OF THE FOREST

The documents that I shall discuss cover roughly the period 1400-1800. It is therefore important to say something of the history of the Forest up to the 15th century.

As I shall discuss only those aspects of the history of the Forest that bear directly or indirectly on its management and development, for coverage of other aspects I refer the reader to the following authors whose works are of particular interest: Warner 1793, Lewis 1811, Wise 1863, VCH 1900 and 1903, Kenchington 1944, and Tubbs 1968.

PREHISTORY

Despite the abundance of finds on the Wessex chalklands, there is, to date, no evidence of settlement in the Forest from either the Mesolithic or Neolithic periods. However, as microlith tools and ground axe-heads have been found within the Forest, it seems clear that the area was hunted during the Mesolithic and Neolithic periods.

The impression given by the archaeological evidence is that true settlement and associated woodland clearance began with the Bronze Age. However, available palynological evidence from Church Moor (fig. 2) and Warwick Slade (fig. 3), shows a marked decline in *Ulmus* at 170 cm, and at 66 cm respectively in these two profiles. The Warwick Slade profile shows the recovery of *Ulmus* during the Sub-Boreal noted by Smith (1959). Figs. 2 and 3, and the Holmsley profile (Tubbs and Dimbleby 1965), show that in zone VIIb the wooded areas were dominated by *Quercus* with a *Corylus* understorey, with *Ulmus* and *Tilia* present though these two latter genera were never abundant in the Forest. While the New Forest diagrams suggest that widespread clearance by settled people is unlikely to have taken place before the Bronze Age, the presence in zone VIIb (Tubbs and Dimbleby 1965) and zone VIIa (Seagrief 1960) of *Plantago lanceolata* and

Fig. 2 and 3

I am grateful to K. E. Barber of the Department of Geography, University of Southampton, for allowing me to include these pollen profiles.

Fig. 2, Church Moor (SU 248068), is the work of students in the Department in 1973/4.

Fig. 3, Warwick Slade (SU 275067), is the work of M. A. Bannon (unpublished B.Sc. thesis 1974).

Pollen zones have not been included in these profiles, but it has been suggested, tentatively, that the boundary between zones VIIa and VIIb lies at 115 cm in fig. 2 and 66 cm in fig. 3. As these profiles are based on the small total of around 150 arboreal grains at each level, Fagus has been recorded only intermittently in zones VIIa, and VIIb. It may however have been present at a very low level throughout.

Fig.2

A POLLEN DIAGRAM FROM CHURCH MOOR BOG, NEW FOREST.

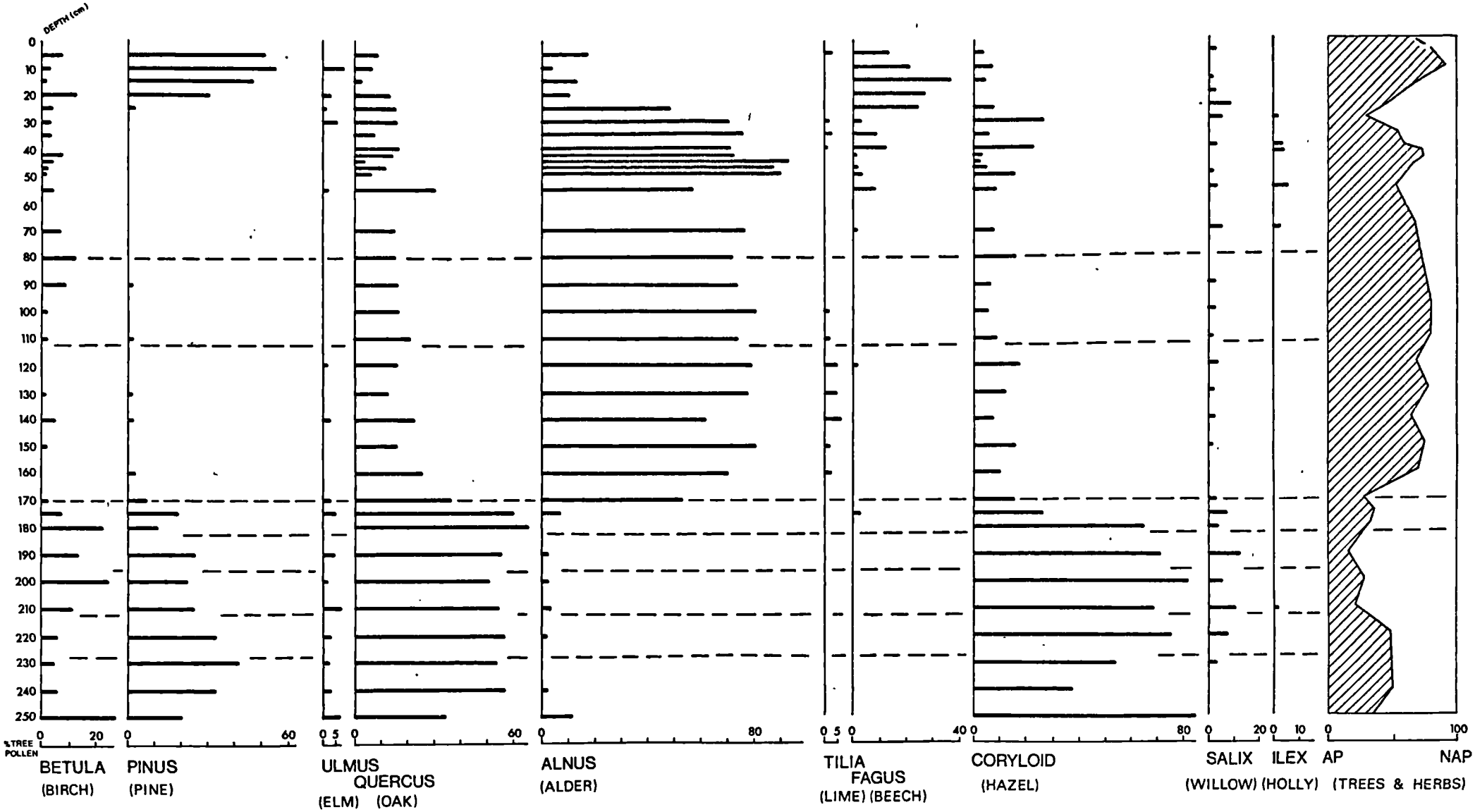
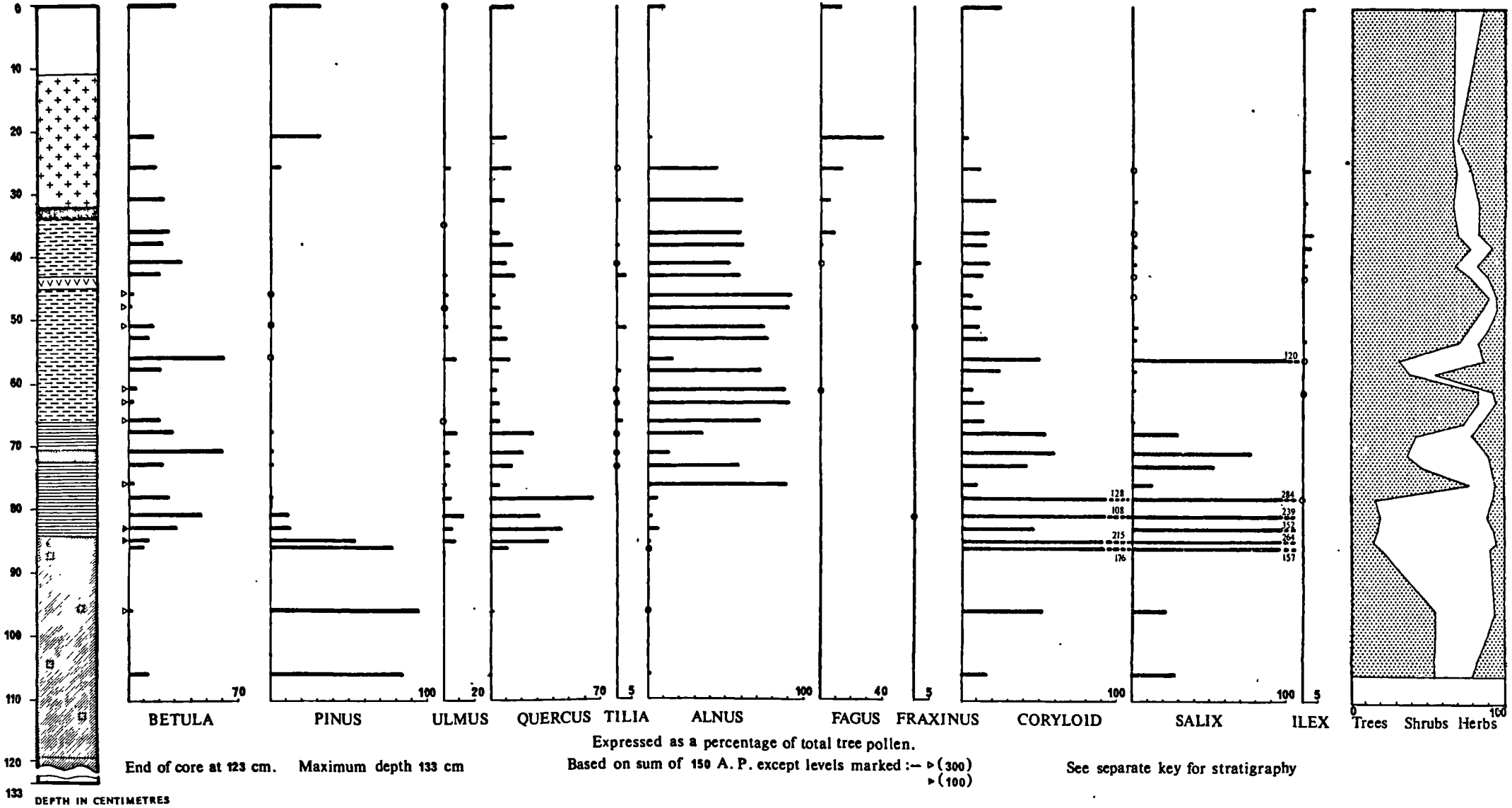


Fig.3

WARWICK SLADE BOG

ARBOREAL POLLEN & SHRUBS



End of core at 123 cm. Maximum depth 133 cm

Expressed as a percentage of total tree pollen.

Based on sum of 150 A. P. except levels marked :– ▷(300) ▸(100)

See separate key for stratigraphy

Artemisia is important. The established association of these open-habitat plants with Neolithic settlement in other areas (Pennington 1969) strongly suggests interference with the natural structure of the Forest by Neolithic man.

Archaeological evidence of settlement within the Forest begins with the Bronze Age. The very large number of burial mounds and boiling pits (Tubbs 1968) which have been recorded within the Forest confirms the presence of Bronze Age man. Pollen analysis of the soil beneath these mounds suggests that some areas had been cleared for agricultural use by this time. The pollen record shows a change from oak/hazel forest in the early part of zone VIIb (Barber 1975, Dimbleby 1962, Tubbs and Dimbleby 1965), followed by a decline in Quercus with a corresponding rise in Pteridium in open areas. The continuing effects of clearance and burning in the Bronze Age can be seen from the Holmsley profile (Tubbs and Dimbleby 1965). Pteridium gives way to Calluna; Quercus falls still further; and there is a marked increase in Betula, the primary invader of burnt heathland sites in the area. Even in the wooded site at Warwick Slade, this increase in Betula is present.

It is important to note that the deleterious effects on the soil of woodland clearance are already recognizable by the time of the Bronze Age. The soil buried under the bank at Holmsley is a humus-podzol, and those studied from later barrows are humus-iron-podzols.

It has generally been assumed that the heathland areas in the Forest are a vegetational response to the poor nature of the soils on which they are found today. This view, held by past authors (Wise 1863) and repeated since, (Kenchington 1944), is still being perpetuated (Tavener 1969). Available evidence shows the opposite to be the case.

It is quite misleading to suggest that the occurrence of the various vegetation types within the Forest is a reflection of the superficial geology. The presence of heathland in parts of the Forest is the direct result of the activities of early man. There is abundant evidence of the ecological instability of the heathland community; in the absence of active management to maintain the community, such heath areas are rapidly invaded by the pioneer species in the woodland succession. In many parts of the Forest, wooded areas are expanding into the surrounding heath, eg. South Ocknell (SU 245108), Woodcrates (SU 270085).

As noted above, the view has been expressed in the past, that the distribution of heath in the Forest is a vegetational response to the base-deficiency of the poorest parent material. There is ample evidence to the contrary: some of the most important uninclosed woods, from an ecological and botanical point of view, are found on Plateau Gravel: Bramble Hill (SU 255162), Frame (SU 355031), and Red Shoot (SU 183083). My own work on adjacent heathland and woodland sites (Flower 1973) at Homy Ridge, shows that where woodland cover is continuously present on Plateau Gravel parent material, podzolization does not take place, and the soil remains an Acid Brown Earth.

Finally, observation in the Forest today shows that even where wood is cleared from gravel areas, it is quite capable of re-establishing itself. In many woods, where gravel extraction has gone on in the past, mature Quercus/Ilex wood is flourishing, as at Amie's Wood (SU 194097), Howen Bushes (SU 232145), Red Shoot (SU 183083), and The Rails (SU 273122).

Seagrief in his work on Cranes Moor (1960) says: "Although heath land is now widespread in the New Forest, the Cranes Moor diagrams give no indication that they existed in the early Atlantic, despite evidence of this kind for Dorset". Diagrams from Dimbleby 1962 and Tubbs and Dimbleby 1965 show the development of heathlands and consequent soil change from a condition of former Quercus-dominated woodland.

There is little evidence of Iron Age occupation within the Forest, and it has been suggested (Tubbs 1968, Tubbs and Dimbleby 1965) that increasing infertility of the soil in areas cleared during the Bronze Age, may have been responsible.

Man the hunter affects an area in which he operates intermittently, not only by the use of fire for driving game, but by the clearing of

run-ways, bark stripping for bast and the accidental spread of fire from temporary camp sites (Narr 1956, Sauer 1956, Stewart 1956). If, as seems likely, Neolithic and early Bronze Age man cultivated on the swidden principle, there is a great deal of ethnographic evidence on the rapid fall in yield resulting from this method (Clark and Haswell 1964, pp. 42-44). While the rate of deterioration may differ from one soil to another, there is no reason to suppose that the principle does not hold good for base poor soils such as the more easily cultivable soils found in the New Forest.

ROMAN OCCUPATION TO THE NORMAN CONQUEST

From the period of Roman occupation there is again no evidence of permanent settlement. While a number of villas lie quite close to the Forest area, no similar remains have been found in the Forest. The only evidence from this period is the large number of pottery kilns, which formed a local industry along the northern edge of the Forest from Fordingbridge to Bramshaw.

Hutchinson 1904 and Kenchington 1944 have suggested that there may have been minor roads across the Forest, but their existence has never been established. We know for certain only that the main roads of the period passed round the Forest. In view of its poor agricultural potential when compared to the established cultivated areas further north, it seems likely that from the end of the Bronze Age to the end of the Norman conquest the Forest was relatively undisturbed.

Permanent settlement of the more favourable areas must have taken place during the Saxon period, since by the time of Domesday permanent villages existed, almost all of whose names are of Germanic origin (Lloyd 1964).

From the Saxon period come the first documents of interest. In the seventh century the customs of the West Saxons were written down as the laws of King Ine of Wessex (Richardson 1922). From the severity of the fines to be paid for the destruction of timber, it is clear that its preservation, both as a source of pannage and browse, and as a valuable commodity, was taken very seriously.

In the ninth century, under Alfred, the system of fining was altered, but remained considerable. The Saxon laws were directed against those who burned or stole another man's wood, whereas Norman law was directed at those who commited offences against the Crown.

There is nothing in the historical record to suggest that the New Forest existed before William I. To the contrary, Warner points out that the designation of the Forest by William I as "New", and the lack of differentiation of assessment from the rest of the county, shows that the Forest in the immediate pre-Conquest period was merely a "forested" part of the county, not subject to Crown Forest law.

The pollen evidence discussed above shows that by the time of the Conquest, cleared areas with Calluna cover and severely podzolized soils were well established in parts of the Forest. The profiles in figs. 2 and 3 show that in the woods immediately round these bogs, Knight Wood, Holidays Hill, and Mark Ash, both the composition of genera and the AP/NAP ratio changed only very gradually during the long period from the end of zone VIIb until after the Norman Conquest. Closed canopy woodland was dominated by Quercus in association with Corylus and Ilex, while wetter sites favoured Alnus and Salix. Of particular importance is the very low representation of Fagus in an area, parts of which have been dominated by Fagus during the last 200 years.

NORMAN CONQUEST TO 1400

The New Forest is the only forest separately recorded in Domesday. The entries, headed "In the New Forest and round about it", list some holdings as having been assessed at a third of their previous value in the reign of Edward the Confessor, while others had their value reduced to nothing.

Medieval chroniclers interpreted the Domesday record as evidence of the destruction and expulsion of the inhabitants caused by William I's creation of the Forest. Gough, in the 1789 edition of Camden's Britannia, was the first writer to question the accuracy of this story, and most subsequent writers on Forest history have discussed it at length (Warner 1798, Wise 1883, Baring 1901, Moens 1903). The chroniclers' accounts must now be seen as the distorted and exaggerated view of writers putting the blackest possible interpretation on the Domesday record for political reasons.

Lloyd (1964) and Stagg (1974) have identified almost all the places listed in Domesday. They have shown that the Domesday manors assessed at nothing and described as being within the Forest, all lie within the medieval boundary of the Forest. Stagg suggests that the private holdings within the Forest were assessed at nothing, not, as had previously been assumed, because they had been depopulated, but because the introduction of Forest Law made the protection of arable crops from deer browsing impossible. Most land, previously under cultivation, became private waste. Rights of common, granted at that time to landowners to compensate for loss of effective control over their holdings, survive in the Forest to this day.

Baring, writing in 1901, put forward the view, generally accepted by

writers since (see Tubbs 1968, p. 40), that the Domesday holdings were sited on what would be regarded today as the richer soils of the area. Baring suggests that the Headon Beds were favoured and that the "bad soils", Bagshot Beds and Plateau Gravel, were avoided. I consider, to the contrary, that present evidence gives a quite different picture.

The north-westernmost site at Godshill, one of the Avon escarpment sites, and the sites at Sloden and Eyeworth, differ archaeologically from the rest of the Forest. The latter two sites have both yielded Romano-British pottery remains, and it is therefore not surprising that they occur on Barton Clay, the purest clay material in the area.

Of the remaining 24 Domesday holdings lying within the Forest, whose positions are now known, every one (with two possible exceptions) was sited on either Barton Sand or Plateau Gravel (see fig. 4). The exceptions are Brookley (now in Brockenhurst) and Hinchesley, which lie on the junction between Barton Sand and the Headon Beds. I suggest that this is wholly consistent with the known agricultural practices of early man. We know from the pollen record that clearance of the heathland areas first took place in the Bronze Age, pre-dating the introduction of the earliest ploughs capable of turning heavy clay soils (Darby 1956). The early settlement pattern of the New Forest was, in my opinion, determined, not by the cultivation of good soil, but by the avoidance of intractable soil. The Domesday sites occur, not on the rich Headon Beds, but on Plateau Gravel and Barton Sand - soils poor in nutrients, but easily cultivable by primitive methods.

The work of Lloyd and Stagg shows that the seven perambulations* up to

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* Perambulations:
King John (undated)
2 Henry III (Winchester College)
7 Edward I (P.R.O.)
26 Edward I (Winchester College)
29 Edward I (P.R.O. This is the often published perambulation)
22 Charles II (P.R.O.)
1801 New Forest Commissioners

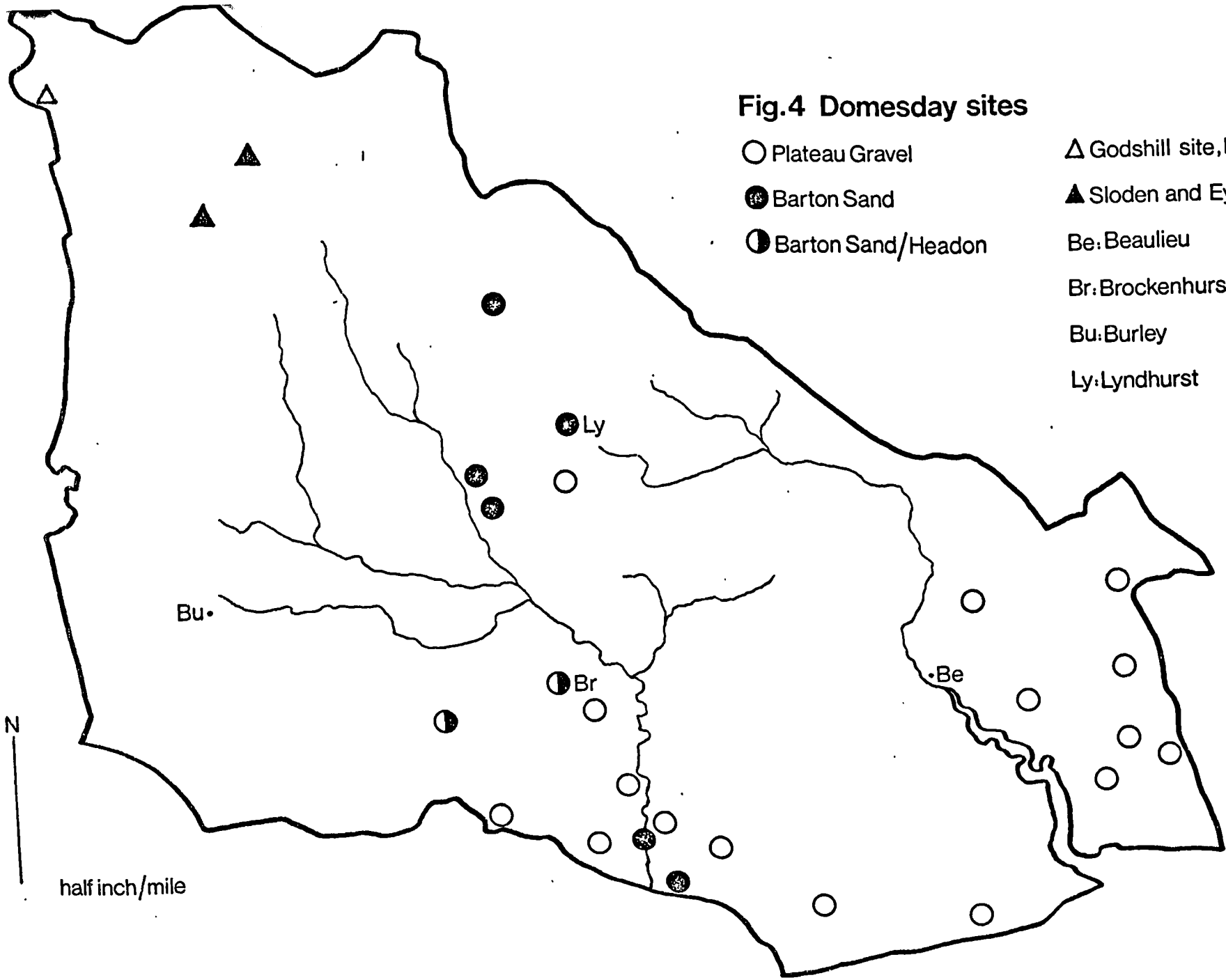
Fig.4 Domesday sites
Plateau Gravel
Barton Sand
Barton Sand/Headon
Godshill site, Plateau Gravel
Sloden and Eyeworth sites
Be: Beaulieu
Br: Brockenhurst
Bu: Burley
Ly: Lyndhurst
Ly
Bu
Br
Be
N
half inch/mile

1801 all describe exactly the same boundary. This traditional boundary was recorded by the Verderers when drawing up the revised 1964 perambulation (Deposited Plan, 1963 Bill, copies of which are held at the P.R.O. and the Verderers Office, Emery Down).

It is clear from this recent work that the area of the Forest probably remained fixed from the time of its creation until 1964, when the Verderers redrew it to take in adjacent holdings. In parts the boundary is the same, but elsewhere major changes took place. In total area, however, there was little difference. Traditionally in the west, the Forest perambulation ran north from Linford (SU 181069) over the tops of Ibsley Common, Dorridge Hill and Blissford Hill, to Godshill Camp. As will be seen from the 1" Tourist Map, the 1964 realignment placed the boundary at the base of the western escarpment, taking in the villages along the east bank of the Avon, from Rockford to Blissford. Four other major areas of change were: (i) the Brockenhurst Park/Boldre area south-east of Brockenhurst was formerly in the Forest; (ii) part of Fawley and Blackfield and all of Holbury, Hardley and Buttsash were in the Forest; (iii) the area north-east of Bramshaw, including Cadnam, Furzley, Wellow and Plaitford Commons, was not in the Forest; and (iv) the Hale Purlieu/Millersford Plantation area also lay outside the Forest.

Finally, I should mention Canute's Law of the Royal Forest, supposedly delivered at Winchester in 1016. This document was shown by Liebermann to be a forgery and was ascribed by him to the reign of Henry I (see Richardson and Sayles 1963). It is thought that it was "discovered" at the time in order to provide a precedent for the extremely harsh Forest Laws being imposed by the Norman kings. It is nevertheless interesting in showing the attitude held at the time of

the relative importance of vert and venison.

Clause 21 (Quoted from Hutchinson 1904)

"For the crime of hunting hath of old, and that not undeservedly, been reputed one of the greatest offences committed in the Forest; but that of vert is so small and trivial (except as a breach of our Royal chase) that our Constitution doth scarcely take notice of it; nevertheless, he that offends therein, is guilty of an offence committed in the Forest."

Clause 28: "No man shall pull down our highwood, or underwood, without license of the chief men of the Forest."
(Licences for wood rights were granted to the officers of the Forest.)

Clause 29: "But if any man cut down a holly tree, or any other tree, that beareth fruit for food for the beasts of the Forest, he shall pay twenty shillings to the King, besides his forfeiture for the breach of the chase."

Conservation of the vert was considered, but only in so far as it contributed to the protection and maintenance of the beasts of the chase. There is no indication that the woods of the Forest were managed as an asset in themselves.

2. DOCUMENTARY EVIDENCE 1400 - 1800

Searches in the Public Record Office during 1974-5 revealed a considerable amount of mediaeval and later documentary material relating to the New Forest.

The aim of the searches was to gather enough evidence of early management methods to enable a fuller and more accurate history of early woodlandmanagement to be written, than that available hitherto. The documents referred to are therefore those which contain specific reference to identifiable places in the Forest, details of management practices, or quantitative or financial timber details.

This section contains a summary of the relevant material, which is presented more fully as appendix 1. Some of the documents have been referred to in previous works on the Forest, and all such references are noted in appendix 1. As far as I know, none of the other documents presented has been cited before in a work on the New Forest.

The fact that the P.R.O. was not formed until the turn of the century may explain why so few of the documents have been examined. Before its formation, the documents which it now contains were held in various repositories, some in London and some outside. Authors such as Wise and Lascelles cite documents generally available in published form, such as State Papers, Close Rolls and Patent Rolls, or documents held by the Office of Woods in Whitehall, which were transferred to the P.R.O. to form the present Forestry Class.

The new material presented here comes mainly from records in the Exchequer Departments, held formerly in various parts of Westminster, in particular, the Land Revenue Office, formerly in Whitehall Place.

The account of the Keeper of the New Forest in 1298 lists land holdings by bailiwick. This system of division of the Forest continued until some time in the late 17th or early 18th century, as will be seen from the last Regards quoted below, from the reign of Charles II.

The map of 1789 by Richardson, King and Driver lists the bailiwicks and their acreages, and shows that the walks of the Forest, the system of division used until very recently, are sub-divisions of the medieval bailiwicks (see table 1). However, if the 150 woods listed in the Taverner Survey of 1565 (see below) are plotted on the map, a discrepancy appears. In fig. 5, a map showing bailiwick and walk boundaries, it will be seen that the boundary to the east of Minstead, between North and Inn Bailiwick, does not coincide with the walk boundary. Taverner lists Halfpenny Herne, Stubby Hat, and woods along the water, as being in the North Bailiwick, whereas on the 1789 map they are in Ironshill Walk. I suggest therefore that Dogben Gutter and

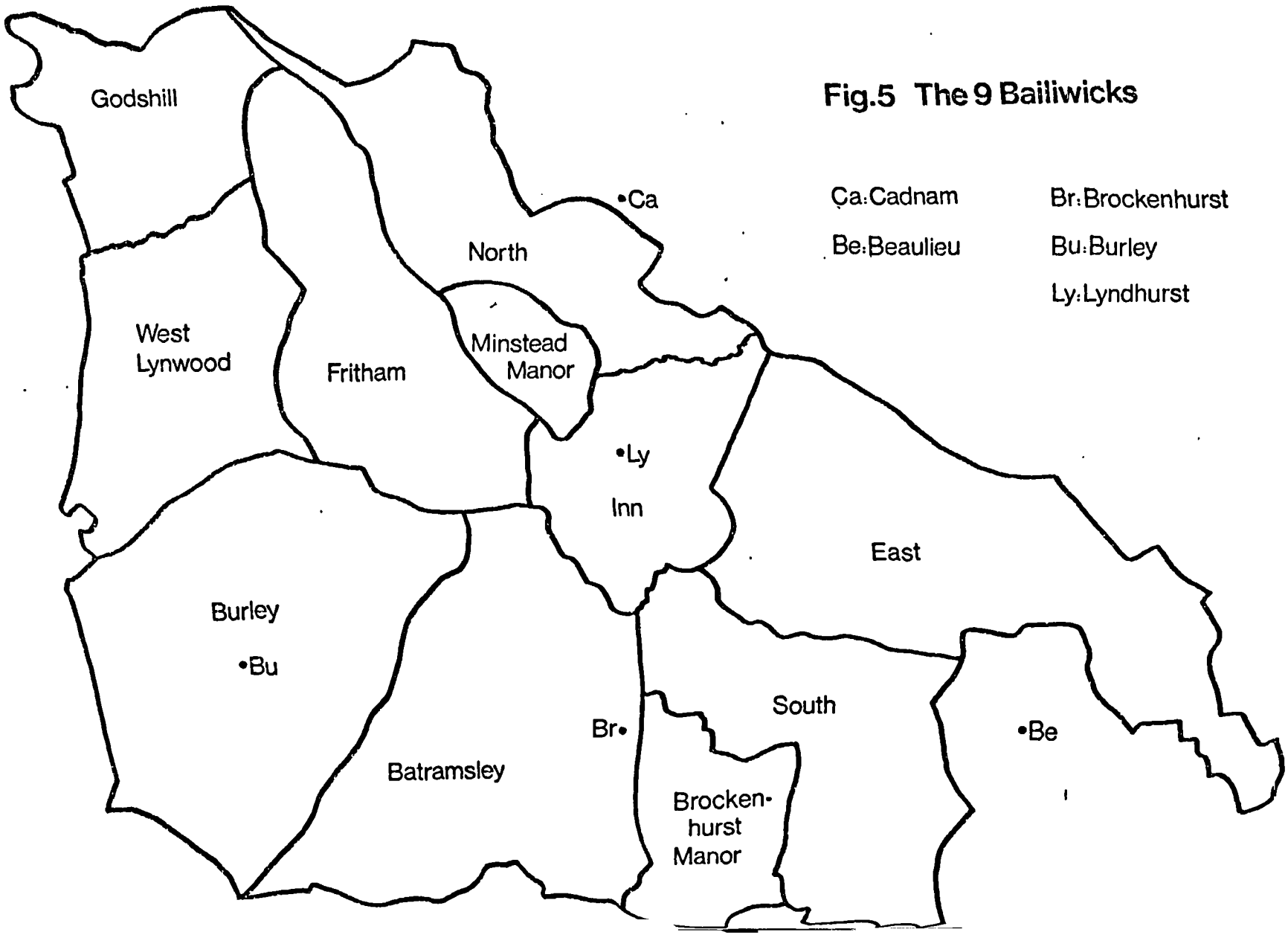

Fig.5 The 9 Bailiwicks

Ca: Cadnam
Be: Beaulieu
Br: Brockenhurst
Bu: Burley
Ly: Lyndhurst

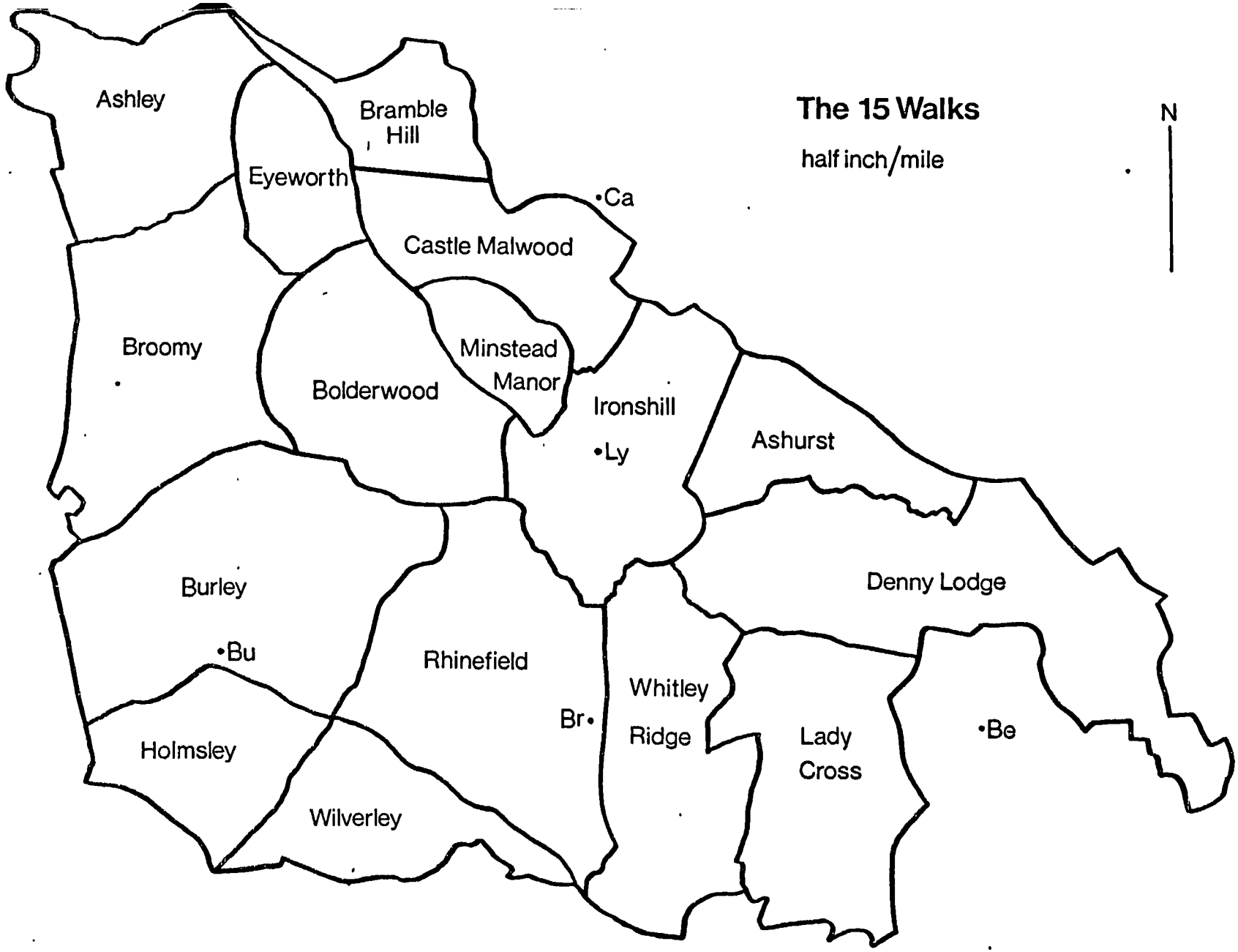
The 15 Walks
half inch/mile
N
Ashley
Bramble Hill
Eyeworth
•Ca
Castle Malwood
Broomy
Minstead Manor
Bolderwood
Ironshill
•Ly
Ashurst
Burley
•Bu
Rhinefield
Br•
Whitley Ridge
Denny Lodge
Lady Cross
•Be
Holmsley
Wilverley

Table 1. Acreages of Bailiwicks and Walks

Bailiwicks	Walks	Inclosed Lands	Forest Lands
Burley	Burley Holmesley	173.3.38	9480.0.24
Fritham	Boldrewood Eyeworth	183.3.32 1.1.30	5291.3.1 1936.0.20
Godshill	Ashley	14.3.32	4112.1.30
Linwood	Broomy	20.3.7	6123.3.22
Battramsley	Wilverley Rhinefield	32.1.11 94.1.21	2875.2.33 6697.3.3
South	Lady Cross Whitley Ridge	72.3.18 46.1.30	5802.3.8 2142.1.0
East	Denny & Noads Ashurst	57.1.16 86.0.28	8053.2.6 2586.2.13
Inn	Ironshill	76.1.39	3651.0.5
North	Bramble Hill Castle Malwood	20.2.22 11.0.29	2068.1.34 3032.2.3
		1192.3.33	63,845.0.2

The above figures, given in acres, roods and perches, are taken from Richardson, King and Driver 1789, and are walk acreages. The acreages of Inn and North Bailiwicks are therefore incorrect, due to the boundary difference discussed in the text.

Bartley Water formed the boundary between North and Inn Bailiwicks. Confirmation comes from the Exchequer Special Commission No. 4472, 2 James I 1604, which, inter alia, describes the bounds of the Manor of Lyndhurst, i.e. the Inn Bailiwick. The relevant part is given as: Northwood Corner (Pikeshill, SU 292088) to Fruffields Wood (Trusslers Wood, SU 296098), by Bounder Trees (Little Fox Hill, SU 298101), to the Two Waters, from the Two Waters (along Bartley Water) to Potters Ford (SU 327109).

In 1606 two of the bailiwick names changed: Battramsley became Rhynefields, and East became Dynney.

The earliest documents, from the 13th century, apart from the Perambulation of 8 Edward I 1280, contain no specific references to woods within the Forest. However, they record offences committed in mature woodland or underwood, in areas lying around the Forest boundary (Dibden, Marchwood, Langford and Lymington), suggesting that at the time woodland covered areas which have long since been completely cleared. Records of holdings, rights and abuses are identified by bailiwick only.

P.R.O. E/101/142 (21) 12 Richard II 1389, contains the earliest general reference to coppices in the Forest and, from 1435 (P.R.O. E/101/142 (7)) onwards, names are given of particular woods or coppices. Although, as I shall show in later sections, the names of some woods have changed or have been used for an adjacent block, most can be correctly identified.

The existence of coppices during the 15th century implies the management of areas within the Forest for the production of timber, although the recorded total of 150 acres suggests that there may have been only a few coppices at the time. This seems likely in view of

the fact that most of the coppices known to have existed in the Forest were formed during Elizabeth's reign, and that in the 15th century the only purpose for which timber seems to have been used was the building and repair of the Royal Hunting Lodges.

In contrast to the few documents extant from the 13th, 14th and 15th centuries, the many available from 7 Elizabeth 1565 onwards reflect the increasing importance placed on the keeping of accurate records.

In 1565, Roger Taverner, Surveyor of Her Majesty's Forest south of the Trent, produced the first survey of the New Forest (included in full as appendix 4 and discussed in section 3). This was followed in 1570 by the first of the Certificates of the Regarders, annual records submitted to the Exchequer by the Regarders. These documents, of which 33 annual sets exist from 1571 to 1673, give answers by bailiwick to eight specific questions (see P.R.O. E/101/142, 1570). The quantitative information which they contain is presented in tabular form as appendix 2.

These certificates show not only the development of detailed records, but the increasing importance placed on timber production. In the light of later surveys from the 17th and 18th centuries (discussed in section 3), Taverner's survey can be taken as an assessment of the area and condition of the sites then regarded as being suitable for the production of fine oak timber.

There are other points which reveal the growing interest in the timber-producing potential of the Forest: first, the steady increase in the annual tonnage felled; second, the introduction of stricter controls on the taking of timber for 'unofficial' purposes; and third, the decline of the coppice system.

1. The Certificates of the Regarders (P.R.O. E/101/142 etc., 1570-1602), which record the timber felled annually in each bailiwick (see appendix 2), show an overall increase in annual total during Elizabeth's reign.

2. In the memorandum P.R.O. E/159/387, 1584, stricter regulations are laid down as to what timber the Forest Officers may take, and the use of timber for house building is forbidden.

3. .The Certificates from most of Elizabeth's reign provide information about specific coppices: acreages sold, the price received, costs for hedging and ditching, and records of intrusions and damage.

John Norden's coppice list and its accompanying notes (see fig. 6 for copy of original and transcript), read in conjunction with his survey of the same year (P.R.O. LR/2/203), provide not only a list of sites under active management, but details of the methods to be used in the future. His exhortation that the number of trees per acre should be increased at the expense of underwood, is an indication of the change in attitude. From 1611 onwards the Certificates contain records of timber provided for the Navy, while all references to coppices have disappeared.

Although the total quantity of timber taken annually had increased during the reign of Elizabeth, it was, at its height, less than a quarter of the tonnage taken in 1632 (see fig. 16). Throughout the reigns of Charles I, Charles II and the Commonwealth, the annual total was very high, exceeding 5,000 tons in 1632, a figure which I suggest was higher than the uninclosed woods in the Forest could provide continuously. The marked effects of this period on the structure of the Forest in succeeding centuries are discussed in section 3, and the

Fig. 6

Com Southt. Xen: forestæ.

A Note of Coppices there and of places fitt to raise Coppices. 282

	Coppices.		places fitt for Coppices.
Vica Kayslwick	Efrons hill. Stubbs coppice Stockley copse		At Pamner. from Palmers Lane to Legore bridge.
Stramsley bay.	Sct-Thomas Bradeley. Stottons	cop:	Builderley Mere-ben-wood. Knightwood. Blackbushe.
Harley Bayl:	Kidley Cop:		Greate Holmesley Cardmalls Spott. Hyperd Spott.
Westrimwoode.			Bloden Harsleye Potte oakes Fern ounde.
Hesnell Bayl:	Castle downe Nornwoodes Godeshill.	cop.	Durberwood
Twitham bayl:	Stocknall Bendley.	cop:	Yarkpitt Bradleys Gibshill Holmeyll Studley Spott.
Orth bayle:			Hascepenne Spring Hamble corner Bigmalled corner Stubbs Spott. Holme hill Brownsdowne.
East Bayl:			Hyrnpes Cussed greate Cattlesford Hommi hyll Rush Towne.
			Hossiers wood Lower Holmes Frenshill Holmes Strelmain Holmes ouldcopyhyll Cynders downe.
Baylinwicke:			

21a

Com Sowtht New foreste A Note of Coppices there and of places fitt to raise Coppices

	Copices	places fitt for coppices
Sowth Bayliwick	Irons Hill Stubbie copice Stockley cop:	At Ramner from Palmers Lane to Legore hedge
Bartramsley Bayliwick	Set Thornes Bradeley Wotton } cop:	Wilberley Muncken wood Knightwood Blacke bushe
Burley Bayliwick	Ridley Cop:	Greate Holmesley Cardinalls hatt Hupers hole
Westelmwoode		Sloden Harsleye Polde oakes Rew ende
Godeshill Bayliwick	Castle Downe Norwoodes Godeshill } cop:	Amberwood
Fritham Bayliwick	Hocknall Bemley } cop:	Puckpitt Brackley Gibshill Holmehill Studley heade
North Bayliwick		Halfepenie horne Lambes corner Bignalles corner Stubbie hatt holme hill Crowseneste
East Bayliwick		Pryors bushes great & little Ashers Honnie hill Rush Turfe

Inn	Cossicles wood
Bayliwick	Lower parte of Ironshill
	parte of Gretnam
	parte of ould Lyndhurst
	Gynery Downe

f.282 verso

If these groundes or the best and likeliest of them were incopiced and used according to the articles annexed they would not onelie raise a benefitt to his Matie yearlie be a great shelter to the game but in time yeeld posteritie supplie of that which without provision is likely to prove both dailie decreasinge and greatlie wantinge for the better motive to this beneficiall course yt may please your Honor to give way at this beginning that some small rent be reserved per acre for that as the course will prove to his Matie and posteritie beneficiall So will it bee unto the Patentees for the present Chargeable and in longe tyme nothing profitable./

It may please your Lo: also to consider the inconvenience of grantinge coppices for lives beinge for the most parte either father or Children or such allies as affecton may bynde and therefore feare the lesse to adventure a - forfeiture by strayninge a point of equitie knowinge that if the first fayle, the second may enter. If it bee the last life the estate being uncerteine they cutt - downe the Coppices within due groweth and by that abuse (continued) the Coppices become thinn decayeinge and deade, besides the negligent Regard of fencinge the like of Coppices in Custodie./

Also in the grants of coppices to have secure provision that the Patentee have no power to cutt or fell anie tree within the Coppice uppon paine of present forfeiture without good cause by good warrant and due assignment for that it is a comon course among the most part of the Tenents of his Mats coppices to fell the best Timber oakes (not a few) to make their hedge stakes: a matter (dulie considered) not sufferable./

Norden

(dated on fly-leaf, 18 April 1609)

surviving effects clearly visible in the woodland age-profiles presented in Part II of the present work.

Finally, the surveys of 1783 and 1787 (H.R.O. 2M30/669 and P.R.O. E/20/48), not previously published, provide an invaluable bridge. On the one hand, they confirm the preceding management history of areas recorded in the surveys of 1563 and 1609; while on the other, they give an accurate picture of the composition of woods whose oldest generations survive today.

3. WOODLAND MANAGEMENT IN THE PAST*

Gerald Lascelles, Deputy Surveyor of the Forest, writing in 1915 said: "In more than one report suggested for adoption it is roundly stated that no cultivation of trees had ever existed in the Forest prior to the Act of 1699. .... We have to look up ancient records (of the 'old woods') long before the year 1700 to show that all these woods were just as much the result of the care of the Forest Officers of those days as is the youngest 'Crown enclosure' in the Forest."

From the evidence now available it is clear that neither of these views is correct. On the one hand, there is evidence of coppice management from the middle ages; and on the other hand, the pre-1700 documents mention comparatively few of the ancient woods. For many of the woods there is no record at all from the past and no documentary grounds on which to base the assumption that they are all the product of deliberate management.

COPPICE MANAGEMENT

The earliest reference to the existence of coppices is the 1389 order to sell 109 acres in "various coppices". In 1435 and 1438 specific reference is made to the coppices at Cranmore and Rampnore. The enclosure of woodland in the Forest for the dual purpose of raising timber trees and underwood is therefore at least as old as the 14th century. From Norden's memoranda given below it is clear that encoppicement consisted of more than just protection from deer and commonable animals, to allow natural regeneration. By 1600 established methods of soil preparation and sowing existed.

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* Details of documents referred to in this section will be found in Appendix 1.

The firstt Act concerned with coppice management, the Act of 22 Edward IV 1483, stated that formerly enclosure of land "to save the young spring of their wood so cut" was allowed for three years. The Act extended this period to seven years.

This was followed, in 35 Henry VIII 1544, by the Statute of Woods, a lengthy and detailed document which recognised, in its introductory remarks, the need for better management: "Unless speedy remedy be provided, there is great and manifest likelihood of scarcity and lack as well of timber for building, making, repairing and maintaining of ships, and also of fewel and fire-wood." This document goes on to give details of the practice to be followed in future: In every acre of coppice of 24 years growth or less which was cut, 12 storers of oak were to be left.* Such storers were not to be felled until they had attained a size of 10 inches square at a height of three feet. When woods or coppices of more than 24 years growth were felled, 12 oaks, or failing these, elm, ash or beech, were to be left to the acre for a further 20 years. Coppices, where underwood was cut on a cycle of 14 years, or under, were to be enclosed for four years thereafter. After cutting on a 14-to-24-year cycle, enclosure was for six years and coppices cut at more than 24-year intervals were to be enclosed for seven years.

An important distinction is made in VCH (vol II, p. 445) between the Acts of 1483 and 1544. Where the former laid down what could be done in Royal Forests, the latter was prohibitive and applied not only to Royal Forests, but to all woods throughout England.

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* Not an exact requirement, but a minimum.

In 13 Elizabeth 1571 the periods of enclosure for the three classes of coppice listed above were all lengthened by two years.

It is important to note that these Acts were designed primarily as a means of encouraging the growth of timber by private landowners, for under the Acts of 1543 and 1571, coppices greater than two acres had to be maintained and could not be cleared for agricultural use. Since the earliest reference to coppices in the Forest in 1389 pre-dates these Acts, it seems unlikely that the system was carried on purely in the interests of timber production. At 12 trees to the acre, the distance between trees is more than 50 feet. This is sufficient space to allow the development of a full open crown and cannot produce long boles (see fig. 1, frontispiece). It is more likely that the object was to maintain a small timber output while also obtaining income from the leasing of underwood rights at a time when such rights were sought after. By 1450 wood for fuel was already in short supply, and coal, although available, could not be used for smelting and was not yet accepted as a domestic fuel (Richardson 1922). During this period little timber of any size was needed for shipbuilding, so there is good reason to suppose that, from the Treasury's point of view, the income for leases was at least as important as that from timber.

By the middle of the 16th century, however, the picture was very different. The increased demand for timber, reflected in the steadily rising price, must have made the growth of underwood uneconomic compared to timber, and it is clear from the evidence that it had virtually died out in the Forest by the end of the 16th century.

Tubbs, in his discussion of this decline (see Tubbs 1964, p. 100), points out that cattle and ponies would hardly have been put into the cut coppices had it still been worthwhile to preserve them. He puts

forward two reasons for the decline: first, the market value of underwood was low and the price of timber was rising steadily; second, the peculiar conditions in the New Forest, whereby commoners had rights of estovers, meant that the usual market for fuelwood did not exist.

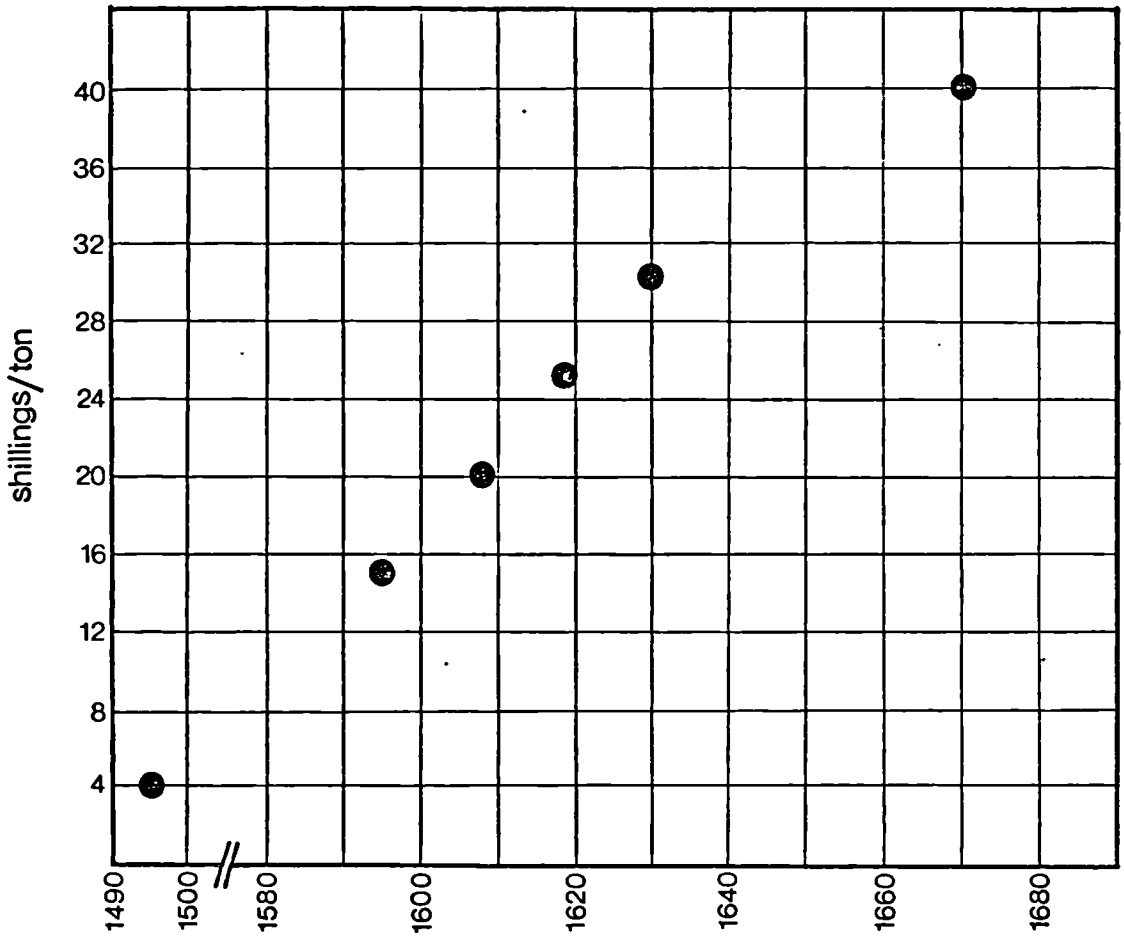
In a period of falling demand it seems unlikely that the business could have borne the additional cost of carriage to outside markets. Hammersley (1957, p. 143) notes that of the 40-50,000 acres of coppice surveyed in England between 1604 and 1612, no more than 16,000 were let, despite efforts by the Crown to increase revenue.

The evidence from the Certificates of the Regarders gives support to the first point. The prices received for underwood in 1572, 1585, 1590 and 1596 were actually falling from £1.8.0. to £o.15.0. an acre, at a time when the price of timber was rising rapidly (see fig. 7).

Hammersley, p. 156-157, records a similar fall in the price of fuelwood in Sussex from 1625-1632. "The vast majority of the population lived on the land and held rights of Common .... wood was generally too expensive to be sold readily at a distance but often too cheap for sale close at hand."

Further evidence of the increasing attention being paid to the growth of timber rather than underwood, comes from John Norden's articles on management methods. (see page 28) Although the number of storers to be left to the acre must still legally have been 12, Norden recommends a much higher figure. He urges the creation of coppices to ensure future supplies of fine timber for shipbuilding, and that the patentee shall "covenant at the first, and nexte fall of that copice to preserve 80 younge storers in an acre at the least And upon the second to reserve onlie 40 of the most likelye and they to stand for

Fig.7 Prices of straight timber



Sources: N.R.S.1896a,1896b, and 1971

timber, though upon the first graunte there be reserved the less rente per acre" (P.R.O. LR/2/194, f.173).

From his remark at the end of this quotation, it is clear that Norden is recommending that the Crown accept a reduced coppice rent in return for a much higher timber yield.

The documents give some idea of the produce of coppices and of the abuses which resulted from the system of dual control in operation. The constant offences against Crown timber inflicted by underwood lease-holders, many of whom were Forest Officers, was just one more reason for doing away with the traditional coppice system.

In 1609 Norden submitted two communications about coppices (P.R.O. LR/2/194, ff.173-174 and 306 and verso), given here in précis. They confirm the practice of seven-year enclosure, and give bank and ditch, with either a hedge or paling, as the only methods of enclosure. In his 1609 coppice survey he also lists a hedge or fence by itself, but they were much less satisfactory methods of excluding browsing animals.

Roger Taverner's 1565 survey and Norden's documents give some idea of produce. Taverner lists ten coppices but mentions the species growing in only five cases, three having timber oak and two, Brodstone and Northwood, having an understorey of hazel (see appendix 4). Norden's survey lists only oak timber trees with ash saplings at Sloden, and underwood of hazel, hawthorn, holly, white and black thorn, and willow.

In his articles he recommends that planting for timber trees should be oak and that the seed dressing for new coppices should be haw berries, hazel nuts and sloes. The Certificate of the Regarders for 1596 states

Précis of Norden's articles: P.R.O.LR/2/194 (ff.173-174 and 306 and verso)

Wastage and decay of coppices

Coppices have deteriorated not only through negligence but through the former practice of the woodwards and officers assuming, that by virtue of their office, they have the right to cut and sell His Majesty's wood, especially in the remoter parts of the Forest.

In old coppices, wood sales have been so poor that after paying for the fencing the return is only 3s. 4d. in the pound. Some woodwards have sold the fencing materials round coppices before they were due to be taken up, which has allowed browsing of the young spring. When the coppice underwood is being felled there has been great abuse of the timber trees by heading and branching, and young storers have been cut to the root.

Means to restore and preserve old coppices

Old coppices badly browsed by cattle should be cut to the ground, encoppiced anew, and fenced round for 7 to 9 years. Gaps should constantly be filled.

Leases of custody of coppices for life or for shorter terms should be avoided because when the end of the term is near the lessee will cut down the whole coppice irrespective of its age, which is very destructive of future growth. Grants should therefore state that it cannot be cut under a certain age and that at the end of the term the condition of the coppice and its fencing must be good. Should the lessee cut the wood prematurely, he must pay compensation for the wood lost.

To raise new coppices

A surrounding ditch is to be dug, treble quicksetted, the quickset to be protected until it is out of danger from cattle browsing, by a dead hay or hedge. The soil must be broken up and sown with acorns, ash keys, beech mast (if the ground is hot and barren), haw berries, hazelnuts and some sloes. At the first felling no oak likely to become timber is to be cut; at the second, preserve 80 storers to the acre; at the third, leave only the best 40 to grow into timber trees.

To raise timber trees only

The site must be as near as possible to a harbour or navigable river. Prepare the soil as above. If, as in the New Forest, there are many stubbed oaks, use them to impale the inclosure, rather than ditch it. Sow or set acorns and in 20 years they will be out of danger, and the pales can be removed. If the young trees appear to be getting too thick, some can be transplanted elsewhere.

To raise timber in open forests

Every keeper and officer should be encouraged to cast acorns, ash keys or beech mast into the straggling and dispersed bushes, which will shelter the twigs as they grow up. This can be carried out by the foresters on their walks.

that Setthornes contained thorn and hazel.

Appendix 22, to the 5th Parliamentary Report 1789, p. 140, gives this anecdote: "... one Elizabeth Bagshot says that when she was a girl she assisted in the planting of Woodfidley, Puckpits and Bemley Coppice inclosures" around 1700. The planting was done in triangles, that is to say, three acorns were planted in a triangle of three foot side. Half a bushel of acorns were issued per man each day. After the acorns had been planted, the ground was sown with haws, holly berries, sloes and hazelnuts. Then drains were cut. The existence of present-day evidence of this planting method is discussed below.

Tubbs (1964) suggests that pollarding may have been accepted practice during the 17th century. However, the memorandum of 1584, listed in section 2, forbade the cutting of tops. While pollarding obviously continued, its illegality is shown by the lopping of 280 oaks in Pold Oaks which is mentioned in the inquisition into spoils in 1608. Certificates of the Regarders for 1576 and 1583 list lops taken with warrant; that of 1595 lists 320 oaks lopped without warrant in Northley. Had the attempt to reduce lopping during the 16th century not been at least partially successful, Peter Pett would not have been able to report favourably on its results in 1632. A century after the 1583 memorandum, pollarding became illegal by Act of Parliament in 1698.

Coppices, if leased, were under dual management. The leasing to Augustin Hill (21 July 1594 and 20 September 1608) of three coppices in Godshill Bailiwick gave him rights to the underwood, while the rights to timber remained with the Crown (see Tubbs 1964, p. 96). This was not altogether satisfactory, as the interests of the two parties often conflicted. People entering the coppices to cut underwood sometimes

damaged or took timber seedlings or storers and neglected their responsibilities as lessees to keep out browsing animals. (see Certs. of Regarders 1573, 1592, 1594, and others).

The lessees, as Tubbs points out, were often residents holding honorific Forest offices. Some would, after taking one cutting from the coppice, use it as a paddock. The Certificates of the Regarders list many intrusions of this kind. The lessees were prevented, apparently with some difficulty, by the Forest officers, and they were also expected to allow the underwoods to grow to a correct age irrespective of the term of the lease, another rule they clearly failed to observe, as can be seen from Norden's comments in the précis given above.

Corruption, in both senses of the word, was common. The offenders reported by the Regarders were often Woodwards, and Swayne, Christmas, Oseland et al., brought before the Eyre Court for theft and corruption on a grand scale, were all Forest officers, either Woodward or Ranger (see P.R.O. LR/2/266, 41-46 Elizabeth).

Almost nowhere in the Forest today is there evidence of traditional coppicing. Pinnick, the one possible example, is discussed in section 4, (the last of the coppices discussed). Veals Cops in Minstead (SU 275109) and Densome Wood in Woodgreen (SU 180174) both contain hazel coppice with oak standards, but both are on private land. Most of the uninclosed woods today have an understorey which occasionally contains hazel (e.g. Deadman's Moor, SU 273082), but which is generally dominated by holly with hawthorn and blackthorn. However, none of the woods known to have been encoppiced at some time in the past contains hazel in its understorey today.

In 1673, 300 acres were inclosed "for a nursery and supply of timber". These were the first inclosures in the modern sense of areas planted for the management of timber alone, although they were referred to in some of the documents as coppices. 1698 marked the official end of the coppice system, for although the Act of 9 and 10 William III of that year did not prevent the continued management of existing coppices, it laid down that future plantations were to be for timber only, and at no time was underwood to be grown.

It appears, therefore, that there have been two phases of coppice management in the New Forest. During the Medieval phase the number of standards was kept at around 12 to the acre to allow the growth of saleable underwood. By the end of the 16th century the timber density had greatly increased at the expense of underwood. Finally, in the late 17th century, the first period of intense felling, the paramount importance of timber brought the growth of underwood to an end.

UNINCLOSED WOODLAND MANAGEMENT

Little information is available about the way in which woodland other than coppices was managed in the past.

Taverner, in his survey of 1565, lists 146 woods. In all but five (the remaining four being destroyed coppices) he describes the woods as being "set" with various species, e.g. "Cardinall Hat set with thornes". "Set", at the time that Taverner was writing, and since, has usually meant the setting of seed or seedlings as distinct from sowing. However, in his survey, contrary to the view expressed by Lascelles (V.C.H. vol. II, p. 446), Taverner seems to have used the word as a synonym for "growing", since the survey contains a number of entries listing "great old oaks" whose origin he could not have known

for certain.

The one specific reference to planting from the 16th century is in the Court evidence of 41-46 Elizabeth (see P.R.O. LR/2/266) which says that the Crown has "a covert or thicket called Sett Thornes containing by estimation 200 acres of wood of 200 years growth which was never encoppiced and by common report the same covert at the first was set by mens hands for the preservation of the Royal beasts ... in which covert were good store of young saplings of oak and ash like to prove to be timber, and very well set and replenished with trees of holly, crab and thorn."

Norden's communications on management given in the last sub-section contain the first definite account of methods used to supplement natural regeneration:

"To raise timber in open forests, parkes, chases and wastes without incopicing.

"Everye keeper in fforeste parke or chase, as also officers within his Majesty's Mannors upon wastes, are to be injoined to caste acornes and ashe keyes into the straglinge and dispersed bushes: which (as experience proveth) will growe up, sheltered by the bushes, unto suche perfection as shall yelde times to come, good supplie of timber." (verbatim P.R.O. LR/2/194 f. 174).

Since there would be little point in carrying out this method of sowing under a closed canopy, it would in practice be a continuous process of gap-filling. There may be evidence today of the results of the planting method described. The practice of throwing acorns into existing bushes, and covering triangular sets with berries, seems a probable

explanation of the striking phenomenon of mature oaks surrounded at the base by their own screen of mature holly (see figs.1, 12, 25 and 26). These are quite different in origin from the adventitious holly rings discussed by Peterken (1964). A fine group of widely spaced oaks encircled by young holly rings of the latter type can be seen at SU 281118, north-east of Seaman's Corner.

It seems possible that the method of sowing in triangular sets mentioned earlier, may not have been confined to coppices and may have been used in uninclosed woods also. I am led to this conclusion by the existence, in most woods in the Forest, of pairs, and on occasions triads of trees, whose bases are, as far as can be determined by eye, centred three feet apart, and whose girths are remarkably similar. I have now measured many such sets; in some cases the girths are exactly the same and, if different, often by less than 5%. However, dissimilarity of girth does not necessarily rule out similarity of age. The fallen beech triad shown in fig.15 was sawn up by the Forestry Commission after I had photographed it, to enable me to make ring counts. Despite the fact that the girths of the three stems were 1.80/2.30/2.80 m, they were all 93 years old.

Oak pairs range in size from well over 3.50 m in girth, that is to say trees of the widely found A2-generation, down to 1.50 m. As this is the smallest girth recorded, it would seem that this method of planting ended around 1850.

A few cases would be attributable to chance, but their frequency strongly suggests that they are the visible result of sown double or triple sets which were not thinned during their growth. Their occurrence, in some cases among older trees, suggests the filling either of existing gaps or the sites of felled, doddard or windfall trees.

I have found no reference to this phenomenon in any work on the New

Forest, or forestry in general, and I feel it warrants further attention; it is discussed further in section 4, subsection 3, page89.

Figs. 8-15 show a few examples. Others have been noted in almost every wood visited, for example:

N. Bentley	243134
Brinken	275065
Brook	261144
Blackwood	258128
Busketts	320111
Eyeworth	224148
Frame	354033, 356035
Mallard Wood	322094
Matley Wood	335077
Sunny Bushes	259143
Stricknage	266125
Stubbs	363034, 362032
Woodcrates	271083

THE EVIDENCE OF INCREASED TIMBER EXTRACTION, 1570-1770

"The purpose of the Crown in the extensive tracts of England appropriated as Royal Forest by later Anglo-Saxon and Norman Kings was initially restricted to deer conservation. Silviculture first appears to have gained some recognition in an enactment of 1483, and from about that time the interest of the Crown underwent a steady change from deer conservation to silviculture, prompted largely by concern for the diminishing quantity of timber available for the construction of ships, and by the realization that with such diminishing resources timber was gaining in market value and therefore represented a

Fig.8
Queen North Wood (SU 233133)
Pair of Quercus robur
Girths: 2.20 and 2.30m

Note: The white measure in this and subsequent photos is three feet long.

Fig.9
Brook Wood (SU 265145)
Pair of Quercus robur
Girths: 3.50 and 3.50 m

Fig.10

Lady Cross Lodge (SU 336030)
Pair of Quercus robur
Girths: 2.90 and 3.00 m

Fig.11

Stonard Wood (SU 257104)
Pair of Quercus petraea
Girths: 3.00 and 3.20 m

Fig.12 Pinnick Wood (SU 191074) Pair of Quercus robur Girths: 2.90 and 3.00 m, with screen Ilex, Girth: 0.90m.(See fig.26 for similarity.)

Fig.13 Anses Wodd (SU 224124) Triad of Fagus windfalls Girths: 1.80,2.30 and 2.80 m. After this photo was taken, the trees were cut to allow counting. Despite the differences in girth, they are all 93 years old. Abutment faces are visible on all three bases.

Fig.14 Frame Wood (SU 354034) Triad of Quercus petraea
Girths: 1.80, 1.80 and2.10 m.

Fig.15 Frame Wood (SU 359036) Triad of Quercus petraea
Girths: 2.00, 2.10 and 2.10 m.

considerable potential source of income." (From the introduction to Tubbs 1964.)

In the sub-section which follows, I shall present quantitative evidence, from the documents listed in appendix 1, which will fully support Tubbs's view quoted above.

It is clear from the Forest Laws of the Norman Kings, that management of the Forest put the interests of the King's venison first, and considered the production of timber as of secondary importance. Even the use of timber, as opposed to underwood, was in the interests of the chase, since the documents cited from the 14th and 15th centuries list timber as being felled only for repairs to the King's various Lodges in the Forest.

The demand for Navy timber during this period was small compared to that during the two centuries which followed. In the reign of Henry V the Navy had some 38 ships of 400 to 600 tons (17 great ships, 7 cargo carracks, and 14 barges with oars). After his death, the Council of Regency ordered their sale. "During the 13th, 14th and 15th centuries ... there was not only no continuity of Naval policy, but the Navy was regarded mainly as a subsidiary arm, useful for transport, but with no value as a weapon in itself." (Introduction to N.R.S. 1896a.) By 1430 only two hulks remained. Henry VII, during his reign of 24 years, had the two hulks refurbished, and commissioned the construction of two small vessels and two men of war, the largest vessels that had been built up till then.

The growth of the Navy really began with Henry VIII. He was the first monarch to build a sizeable Navy and to set down principles of Naval administration. "At the time of Henry's death there were 53 King's

ships, six of them over 500 tons. By the beginning of Elizabeth's reign, there were 26, and when Hawkins became Treasurer (1577) only 22, some of which were mere pinnaces. Within ten years he had created a new fleet of 25 ships, half of which were new and the rest rebuilt." (Lloyd 1954.)

Table 2. Royal Navy Tonnages at Monarchs' deaths

1547	Henry VIII	12,455
1553	Edward VI	11,065
1558	Mary	7,110
1603	Elizabeth	17,110
1625	James I)	uncertain
1649	Charles I)	
1660	Restoration	57,463
1685	Charles II	103,558
1688	James II	101,892
1702	William III	159,017
1714	Anne	167,171
1727	George I	170,862
1760	George II	321,104

Source: 11th Parliamentary Report 1792, Appendix 23.

Hammersley (1957, p. 154) "James I and Charles I had built less than 30,000 tons of Naval shipping in forty-four years, Elizabeth probably less than half that tonnage during her reign. The Commonwealth constructed more than 36,000 tons in ten years."

Before discussing figs. 16, 17 and 18, I should explain their construction. All the data contained in them come from the Certificates of the Regarders which are given in tabular form in appendix 2.

As well as the four categories listed in Appendix 2, the Certificates of the Regarders sometimes record the number of loads of tops, lops, and boughs taken by the Keepers. As these figures do not affect the timber tonnages, I have not included them in Appendix 2.

Feewood is measured in loads in the Certificates. A load of wood is given by Zupko (1968) as being 50 cubic feet. In answers to Lord Glenbervie (1807) the majority of authors agree with this. The terms "ton" and "load" are both freely used in 16th, 17th and 18th century documents, and while being close are not exactly the same. The ton is based on the weight per unit of oak whereby 40 cubic feet of squared timber weigh roughly a ton. It can be more or less according to the specific gravity of timber, English oak ranging from 45 to 70 lbs. per cubic foot. The load is a measure of volume rather than weight. It is 50 cubic feet of loose timber or squared timber, or 40 cubic feet of timber in the round. This figure is the quarter-girth figure giving the volume which will be left after squaring. 40 cubic feet of round timber, and 50 cubic feet of square; therefore, both weigh approximately a ton and a quarter, and take up roughly the same space.

Since loose wood cannot weigh as much as solid, the load used for Feewood is almost certainly less than a ton.

The figures given for moorfalls, doddards and timber trees cut with and without warrant are given sometimes in tons and sometimes in numbers of trees. In either case, the equivalent figure of weight or number was arrived at by calculating the mean figure of weight per tree for each category.

	Mean weight (tons) per stem
Moorfalls	0.9 oak
	0.6 beech

Fellings with and without warrant:

1570-1632	1.9 oak
	2.5 beech
1662-1673	2.2 oak
	no beech

Throughout the Certificates, timber felled with or without warrant is described as "so many timber trees of oak and so many beeches", or "so many timber trees and so many beeches". There is no suggestion that timber trees are anything but oak. This is also the impression given by Norden in his articles on planting, quoted earlier, where he says that oak should be planted for producing timber; he does not mention beech as a timber tree.

The 1764 survey, as widely quoted, gives the number of trees suitable for the Navy as 19,836. Actually the whole survey, given in Appendix 32 of the 5th Parliamentary Report, lists 19,836 oak, and 7,104 beech which are not counted as Navy timber. The construction of ships' hulls was predominantly of oak. Elm and beech were both sometimes used as planking for the permanently submerged areas near the keel. The danger in using beech is remarked on by Pepys: "Bonadventures oak planks underwater unaffected by worm, but the lower strakes next to the keel, being of beech, are very dangerously eaten." (N.R.S. 1925.) "In 1757, the dockyards received 20,000 loads of oak, 3,800 loads of elm and only 274 loads of beech, a typical proportion for the century." (Albion 1926.) Only good quality oak could withstand the alternately wet and dry conditions above and below the water-line.

The total figures for beech felling during the period covered are so low (see appendix 2) that there seemed little point in calculating

oak/beech ratios by year. In some years there are no beeches noted at all.

Up until 1583 Keepers had rights to windfalls, moorfalls and fallen boughs as well as their statutory fuelwood right. Green timber could only be cut by warrant and if it was to be used for constructional work, as was usually the case in early Elizabeth, was delivered to one of the mills at Christchurch, Totton or Ringwood.

As noted above and shown in table 2, the total tonnage built declined after Henry VIII's death. Fig. 16 clearly shows the small volume of timber being taken during the early part of Elizabeth's reign.

From 1575 onwards there is an irregular but overall increase in the volume of wood cut. However, even after 1577 when Naval construction began once again, the volume taken is small compared to that in the Stuart period. The entries in the Certificates suggest that much of the timber was still used for purposes other than shipbuilding. 1583: 200 oaks felled for repairs to Her Majesty's Castles in the Isle of Wight. Of the 307 trees cut by warrant in 1587, 130 were for building repairs and 177 were delivered to the ports of Lymington and Portsmouth. The entry for 1601 is the first to specify timber for the Navy: 200 timber trees for the Navy, 60 to the Master Gunner at Portsmouth, 20 for repairs to Winchester Castle, and 19 for Lodge repairs in the Forest. Some of the documents also list the felling of alder, which was used as scaffolding for building repairs to the Lodges (see Cert. Regard. 18 Elizabeth and 38 Elizabeth).

Table 2 shows the steady growth of the Navy from 1580. There are pauses in this otherwise steady growth during the reigns of James I and James II (not shown in table 2). Trevelyan (1959): "James I disliked

'men of war' whether by land or sea ... he was the most thorough-going pacifist who ever bore rule in England. He was the only Stuart King of England who utterly neglected the Navy." Lloyd (1954, p. 53): "A Commission set up in 1618 ... found that of the 43 ships supposed to be in the Navy, 21 were either non-existent or so rotten that they could not be put to sea."

It is noteworthy that the four Certificates which exist from the reign of James I list timber felled by warrant for Lodge repairs, but none for other uses. Contrast this with the Certificate for 1632, in which 400 trees were taken for repairs to the Garrison at Portsmouth, and 1,703 were taken by Thomas Williams for the Navy. All the remaining certificates from 1632 to 1673 list separately, by bailiwick, the fellings for the Navy.

Unfortunately I have found no Certificates of the Regarders from the Commonwealth period, but it seems certain that timber continued to be felled in quantity for the construction of the New Model Navy (see table 2).

With so few figures available, it is impossible to calculate the total tonnage removed during the period 1625-1685, but if the figures given in fig. 16 are typical, the rate of extraction of usable timber was of the order of 3,000 tons a year, probably more. Fig. 16 is based on recorded fellings, mainly of oak, including small quantities of beech and ash; but it must be borne in mind that a considerable amount of immature timber was removed illegally for charcoal burning, which must have affected the total standing volume. (See, for instance, Cert. Regard., 39 Elizabeth 1597, Coal-fires in Ocknell Wood.)

Nicholls, in his correspondence with Fordyce in 1791, suggests that

2,500 acres of oak plantation, managed correctly, could yield 1,000 loads a year suitable for the Navy. In the next sub-section I shall suggest that Taverner's survey listed the woods in the Forest which were under some form of management. Since many of these sites are listed again in 1609 and 1660 it seems likely that the management pattern of the early 16th century continued, in which case roughly 5,000 acres were being managed for timber production. Even if the methods used had been as productive as those envisaged by Nicholls in 1793, the acreage would not have provided the volume being felled during the Stuart period and these fellings must therefore have exceeded the continuous yield available from the managed areas. The balance must have come from the older generations in the uninclosed woods, and eventually from the removal of doddards. The figures for 1632 list 250 tons of doddards out of a total of 5,000 tons. By the reign of Charles II, doddards account for half the total.

The 1964 Forestry Commission Working Plan for the Forest, in considering the extraction of mature timber from the A & O woods, came to the conclusion that the maximum figure for continuous yield was less than 15 hoppus feet per acre, or a total of 100,000 hoppus feet annually from all the A & O woods. On this basis, at a yield of 10 hoppus feet per acre, 10,000 acres of woodland could not, on a continuous basis, have yielded the volume of timber being felled during the 1625-1685 period.

Fig. 17 shows the quantities of windfall and moorfall timber removed each year from the Forest. As would be expected, it shows wide fluctuation from year to year, but no obvious overall change. Two factors, differing weather, and inconsistent removal, would cause annual variation. Assuming that the relative areas of woodland in each

Fig.16 Annual felling totals

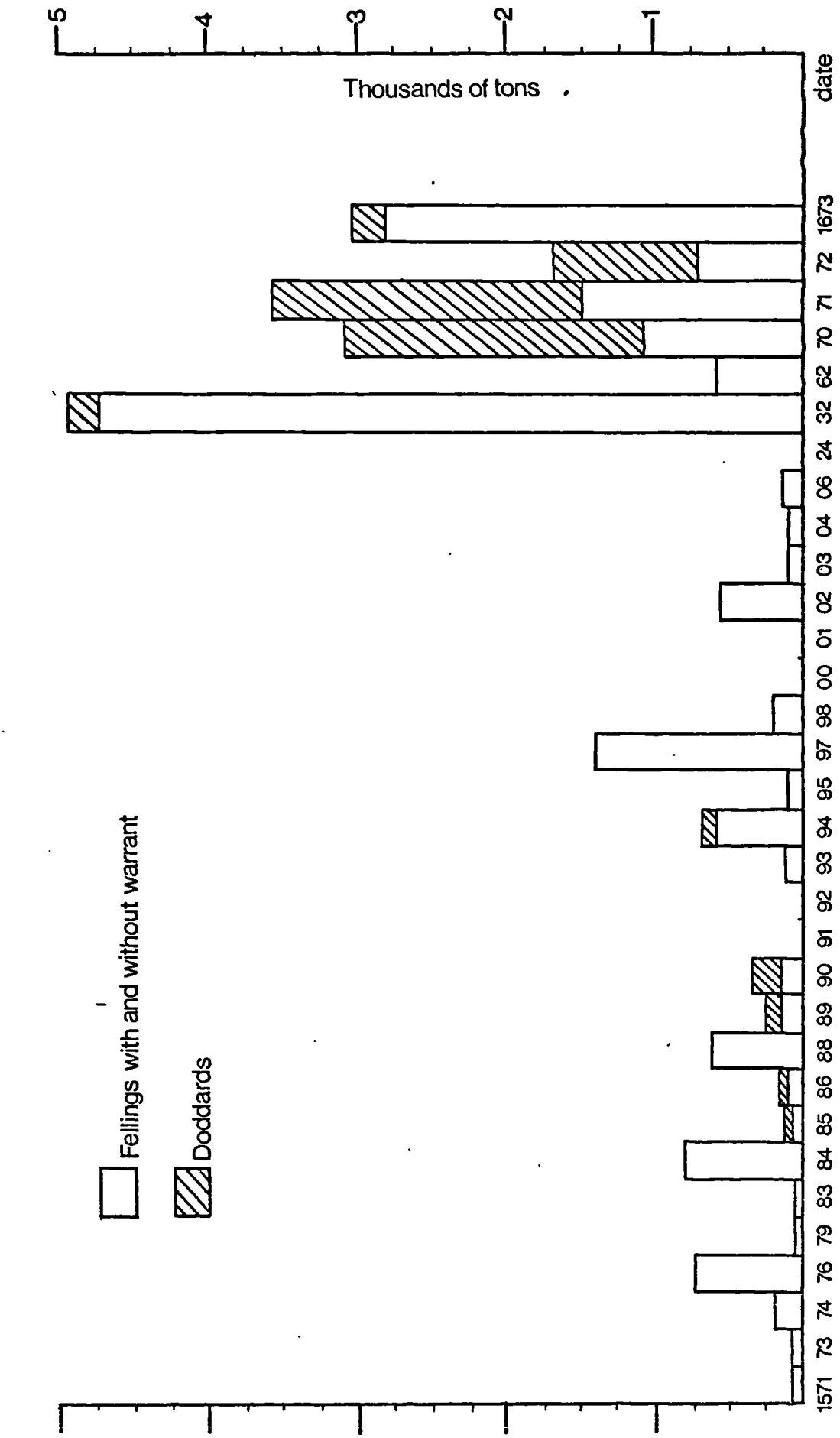


Fig.17 Annual Moorfall totals

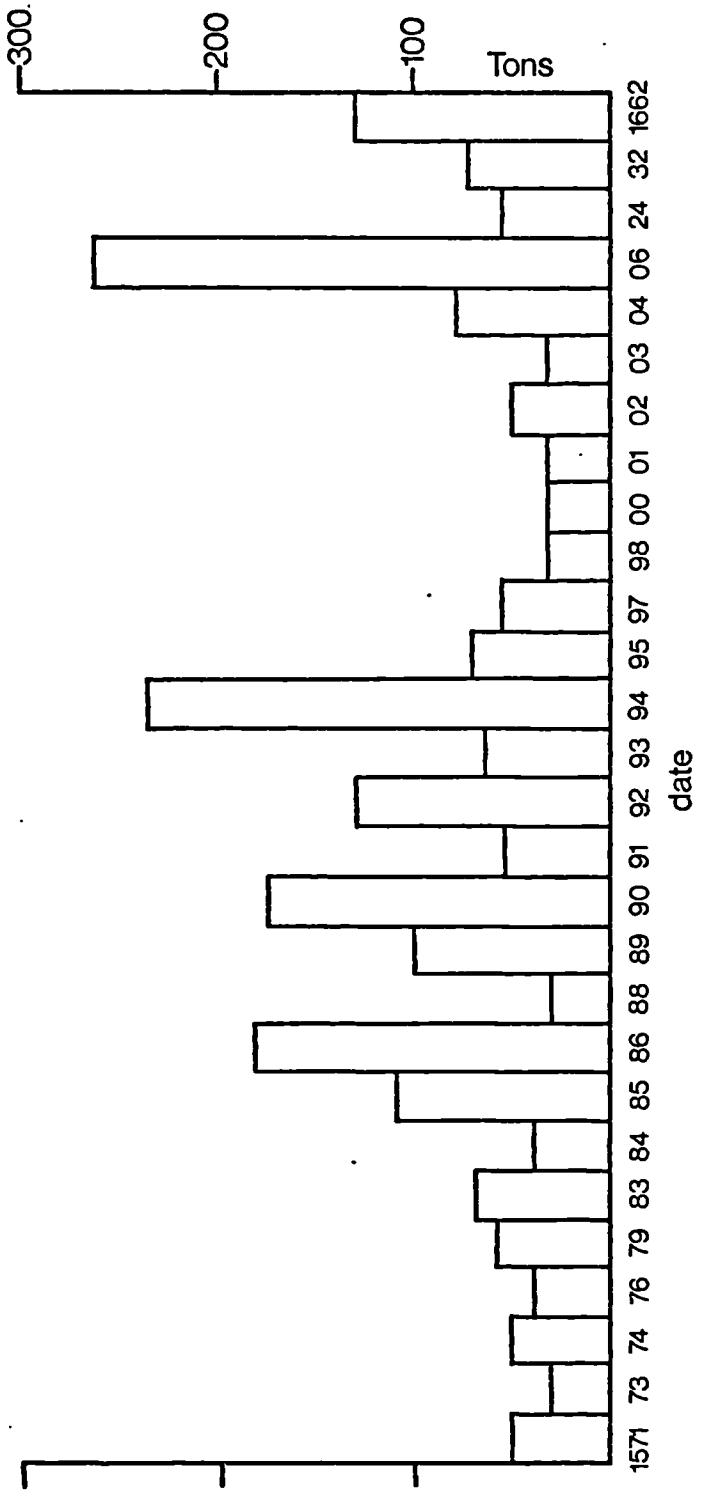
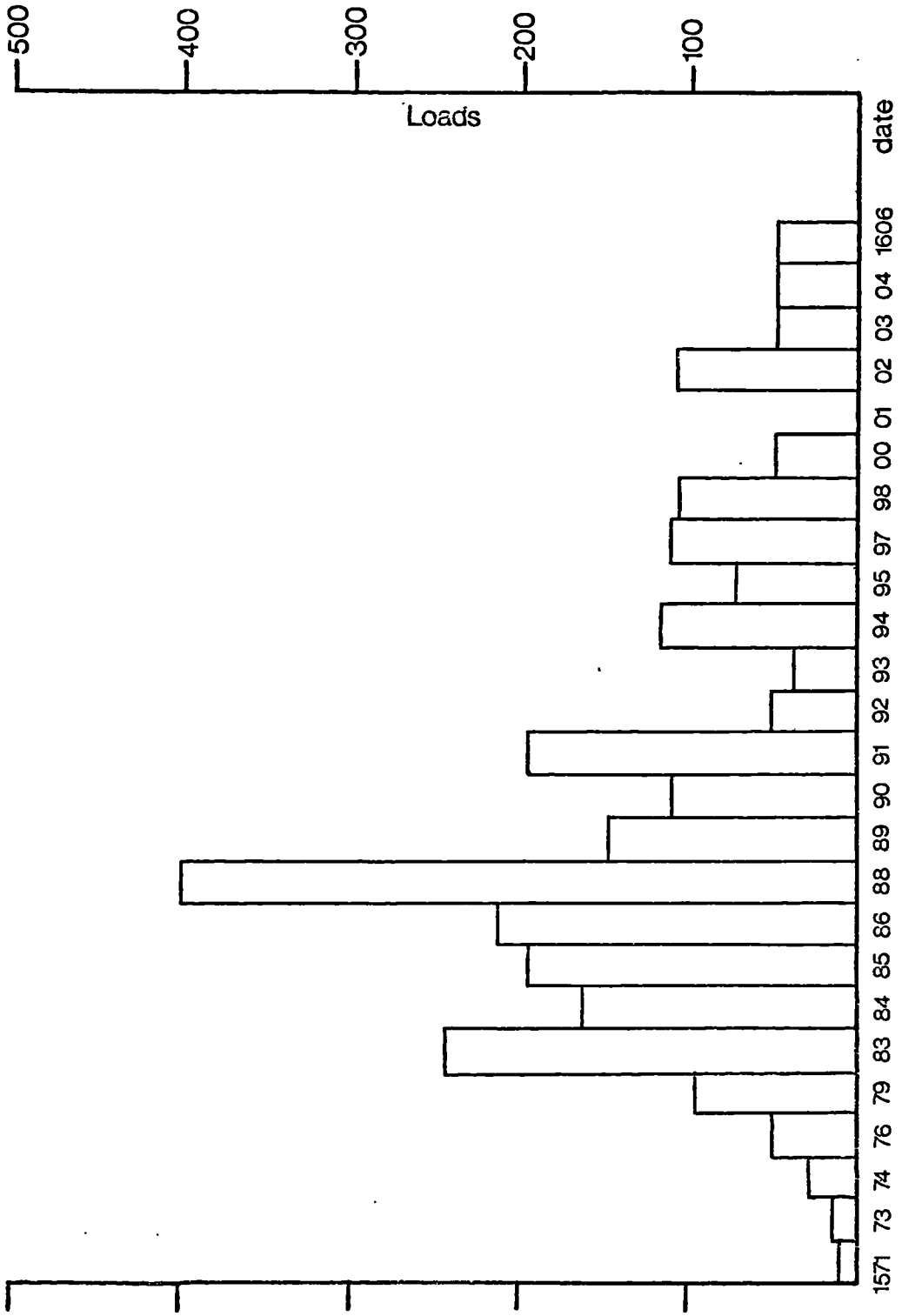


Fig.18 Annual Feewood totals



bailiwick remained unchanged over the 60 years following the Taverner survey, the number of windfalls and moorfalls would be expected to show a rough correspondence to the areas from which they were being taken. Column 2 in table 4 shows that such a correspondence does exist, and with a very high correlation, r = +0.956. The importance of this point will be brought out below in the discussion of Taverner's survey.

Fig. 18 shows the quantities of wood taken from the Forest in fee. There is a definite peak in the 1580's, followed by a gradual decline. Throughout Elizabeth's reign the bailiwick Keepers were entitled to 12 loads of feewood per annum. The number of other people entitled to fuelwood seems to have increased and by 1587 Keepers, Woodwards and Regarders were all claiming, making a total of 36 loads from some bailiwicks. On top of this were grants issued by the Crown to Thomas West and the Earl of Pembroke for fuelwood rights amounting to 50 loads each in 1584 and 1588. There is no further reference to these grants, and thereafter the volume reverts to 12 loads per Officer per year. Sometimes 9 Keepers claimed, making 108 loads, and sometimes only 4, making 48 loads. There are no entries for feewood in the Certificates from the Stuart period.

FOREST AREAS

A comparison of the second perambulation of Edward I in 1300 with today shows that although the distribution was slightly different, it was much the same in total area. Detailed figures are only available from 1789 onwards:

Table 3 Forest Areas (Acres)

	1789	1893	1972
Plantations inclosed	63,845	11,138	21,360
Plantations open		6,532	
Open woodland		4,500	10,072
Heath pasture and bog		40,478	35,650
Crown freehold	3,723	2,089	Now inclosed
Total	67,568	64,737	67,082
Private property	24,797	27,658	26,000
Total Forest area	92,365	92,395	93,082

Sources: 1789 Parliamentary Report, 1893 V.C.H. vol. II, 1972 Forestry Commission 1972-1981 Management Plan.

It is, unfortunately, not possible to compare the extent of woodland cover at different periods. Taverner's survey of 1565 gives acreages by bailiwick, but the total of 5,290, less than a third of that existing in 1789, seems far too low for the time, and documents listed in appendix 1 show that he did not list all the woods then known. The first column in table 4 gives the percentage that each bailiwick represents of the total acreage.

The increase in open woodland in 1972 is largely the result of the throwing open of areas inclosed in 1893. The decrease in heath is the result, partly of inclosure, and partly invasion by Scots pine.

Table 4

	1	2	3	4	5	6
North	22.6	37.2	44.0	23.4	9.2	15.6
South	11.0	10.7	17.6	12.8	12.2	11.6
East	7.7	5.4	9.0	3.4	9.5	8.9
Westlyn	6.5	5.0	1.3	13.7	6.5	3.4
Battram	12.3	11.1	2.5	2.9	16.8	19.3
Burley	8.6	0.9	3.5	15.9	9.5	4.2
Fritham	16.7	17.7	7.0	18.9	12.5	10.9
Godshill	4.4	0.8	5.7	4.3	7.5	3.4
Inn	10.2	11.2	9.4	4.7	11.5	22.7

1. Taverner Survey 1565. Percentages in each bailiwick of total woodland.
2. Percentages of total numbers windfall and moorfall timber sold 1570-1632.
3. Percentages of the total number of trees felled by warrant in Certificates of the Regarders, 1570-1632.
4. Percentages of the total number of trees felled by warrant in Certificates, 1662-1684.
5. Percentages of total of 12,476 trees suitable for the Navy recorded in 1707 survey.
6. Percentages of total of 19,836 trees suitable for the Navy recorded in 1764 survey.

SURVEYS

I feel that a great deal of misunderstanding has been caused by the failure to recognize what the various surveys from 1565 to 1789 were actually recording.

Table 5. New Forest Surveys

	Trees fit for the Navy		Doddard & Decaying Trees		Total, Loads
	No.	Loads	No.	Loads	
1608	123,927	197,405	-	118,072	315,477
1707	12,476	19,873	-	-	19,873
1764	19,836	36,662	1,743	3,835	40,497
1783	12,447	19,827	596	1,003	20,830

Table 5, as it is given here, first appeared in the 5th Parliamentary Report of 1789. It has since been reprinted many times (Lewis 1811, Wise 1863, V.C.H. 1903, Hutchinson 1904, Lascelles 1915, Young 1935, Rogers 1941, Kenchington 1944) and used as the basis for the perpetuated view that the Forest was devastated and barbarously treated by the Stuarts. Not one of the authors noted above makes clear what classes of timber the surveys attempted to record; nor do they refer to other statements which accompany the surveys in the 5th and 11th Reports. Wise, for instance, refers merely to "trees fit for felling", while Rogers, citing Wise as his source refers to "sound trees fit for use". As I shall show, these surveys refer to certain classes of timber, and are by no means a measure of the overall condition of the Forest at the times in question.

1565 Roger Taverner's Survey

There are three important points to note about this document.

First, it covers in acreage rather less than a third of the woodland acreage known to exist in 1789. As the documents presented earlier show, he did not list all the wooded areas in the Forest at that date.

Second, there is a close correspondence between the acreages and moorfall and windfall percentages in columns 1 and 2 in table 4. In 1565 windfall sales were still a Keeper's perquisite and they would presumably get most windfalls from the areas in which they were working in the course of their management duties.

Third, there is the frequent differentiation in the survey (in 26 entries), between oak and beech in general, and "timber", e.g. "Doggespitt set with oaks part timber", "Fayre Cropte, Ironshill and Malwood set with oak and beech for timber."

Timber in this context is surely timber suitable for plank, that is to say timber which in the later surveys is called "timber suitable for the Navy", as opposed to older trees suitable for compass timber, or younger stock. These three points together suggest that Taverner's survey is in no sense a general survey of the Forest, but is a survey of the managed areas. Coppices were managed for the production of timber standards, and underwood, while the rest of the area in Taverner's survey was uninclosed woodland managed, by the methods described earlier, for the production of usable timber. Older, open-habit oaks in these woods gave a continuing source of knee and compass

timber.

The remaining and unmanaged two-thirds of the wooded area may have changed very little since the Norman period, when the needs of the deer took precedence over other demands.

1608 Survey

This survey gives very little information, but the figures of Navy timber show that the average stem gave 1.6 loads or 80 cu.ft. The 5th Parliamentary Report says that it included this survey in order to show what could be achieved by careful management, implying, first, that the total of 123,927 trees was all the result of management, which may not have been the case, and second, that the great dearth of timber in the 1707 survey signified an absence of care.

1707 Survey

The total recorded in this survey is a tenth of that in 1608. The 5th Report says that this and the later surveys prove what devastation had taken place during the Civil War. This view has been perpetuated, and all the authors (listed earlier) who have quoted these survey figures refer to this terrible decline in the total timber recorded in the Forest. None of these authors mentions the notes accompanying the the survey, which say that all the above 12,000 trees, suitable for the Navy, may be felled over the next 40 years without detriment to the Forest, there being so many young trees, not yet of a sufficient size. There will in 40 years be at least as much stock as there is now. Also many large beech trees, injurious to the oak by growing too close to them, would be of use to the Navy and their removal would benefit the growth of the young oak.

"We find also in the Forest a great number of old oaks, from the limbs of which may be picked very useful parts as knees, though the bodies may be decayed." (5th Parliamentary Report, Appendix 32). They recommend that 50 be cut annually.

This last point suggests the existence at that time of at least 2,500 old oaks. This is completely in accord with Defoe's observations in 1724:

"As I rode through the New Forest, I could see the ancient oaks of many hundred years standing perishing with thin withered tops advanced up in the air, and grown white with age (presumably a reference to the heavy cover of epiphytic lichens on old oaks), and that could never yet get the favour to be cut down, and made serviceable to their country.

"These in my opinion are no signs of the decaying of our woods or of the danger of our wanting timber in England."

The second point brought out, by the notes quoted above, is that a generation of young oaks which would reach an age fit for the Navy 50 years later, must have dated from around the middle of the 17th century. The existence of this young generation during the Stuart period is confirmed by Presentments of the Regarders in 1660 (see transcript of P.R.O. E/32/177 in section 2), in which several woods are listed as containing young timber.

There seems no doubt that the 1707 survey gives a record of the very heavy felling that went on during the reigns of Charles I and Charles II and the Interregnum, but the previously held view that this was accompanied by a total disregard for future supplies seems wrong in the light of the evidence.

1764 Survey

The prediction in 1707, that the stock of timber would increase, is confirmed by the 1764 survey. The stock increased by 63% and the average stem yield was 90 cu.ft., compared to 80 cu.ft. in the other three surveys. The full survey includes a figure for beech of 7,104 trees yielding 13,144 loads, giving an oak/beech ratio of 2.8:1 in both number and volume.

1783 Survey

The 5th Report, for which this survey was made, refers to the great influence which Evelyn's writings had on silvicultural practices in the second half of the 17th century. The inclosure of 300 acres by Charles II was followed by the Act of 9 and 10 William III (1696) authorising the inclosure of a further 6,000 acres every 20 years. The fact that this system of rolling inclosure was never actually put into continuous operation, and the general lack of care in the early part of the 18th century, are cited by the 5th Report as the reasons for the decline shown by the last survey of 1783. It hardly seems possible that the small inclosures made at these times could have affected the total volume to the degree shown in the 1764 and 1783 surveys.

Suspicion of the widely quoted 1783 survey is aroused by a comparison of the 5th Report of 1789 on the New Forest and the 11th Report of 1792 on Timber for the Navy. The 5th Report gives the figures listed in table 5. The 11th Report, however, gives different figures for the 1783 survey: 32,611 trees fit for the Navy yielding 33,666 loads and 2,067 loads of doddards. (11th Parliamentary Report, Appendix 14.)

Appendix 13 of the 11th Report states that the following numbers of loads of timber have been delivered from the New Forest:

	oak	beech
To Portsmouth	46,525	15,906
To Plymouth	512	-
To Woolwich	129	-

The answer to this discrepancy lies in the fact that neither Report quotes accurately the original 1783 survey. (See xerox fig. 19). The original shows that the number of oaks fit for Navy use is 29,364, or 41,792 if knee timber is included. These trees are classed as being 45 feet and upward, but the figures give a mean volume per tree of 80 cu.ft., so the size of timber is the same as in the earlier surveys. Although it is stated in the answers to Lord Glenbervie (1807) that the earliest age at which timber is of use to the Navy is 100, most timber would have been much older.

Forestry Commission yield tables, which only go up to 150 years, give the following figures for oak, the class depending on the suitability of the environment for growth:

(breast height diameter in centimetres)

class 4	35 at 100 years	47 at 150 years
class 8	52 "	71 "

In hoppus feet these diameters represent roughly:

class 4	10 at 100 years	18 at 150 years
class 8	23 at "	44 "

In 1972 I took increment borings from nine oaks in South Ocknell Wood

Fig.19 (fold-out)

(SU 246108). They gave a growth rate similar to class 8 above, achieving a diameter of 50 cm in 90 years on a sub-strate of Barton Clay. Some of the present oak plantations in the New Forest are rated by the Forestry Commission as class 8, but most is class 6 and some class 4. Ring counts from felled trees and girth measurements from many parts of the Forest of oaks of known age, e.g. 1700 and 1775 Inclosures, are contained in fig. 20. They show a girth increment per century of 1.2 to 1.5 metres, depending on the environmental conditions (figures are to the nearest 10 cm).

An interesting addition to these data comes from "The Scotsman" of 11 August 1893, which contains a report on a visit to the Forest of a party from the Royal Scottish Arboricultural Society. Among other things, the article records the girth of the Knightwood Oak as 19'9" (6.0 metres). Today it is 7.20 metres, an increment of 1.4 metres in a hundred years.

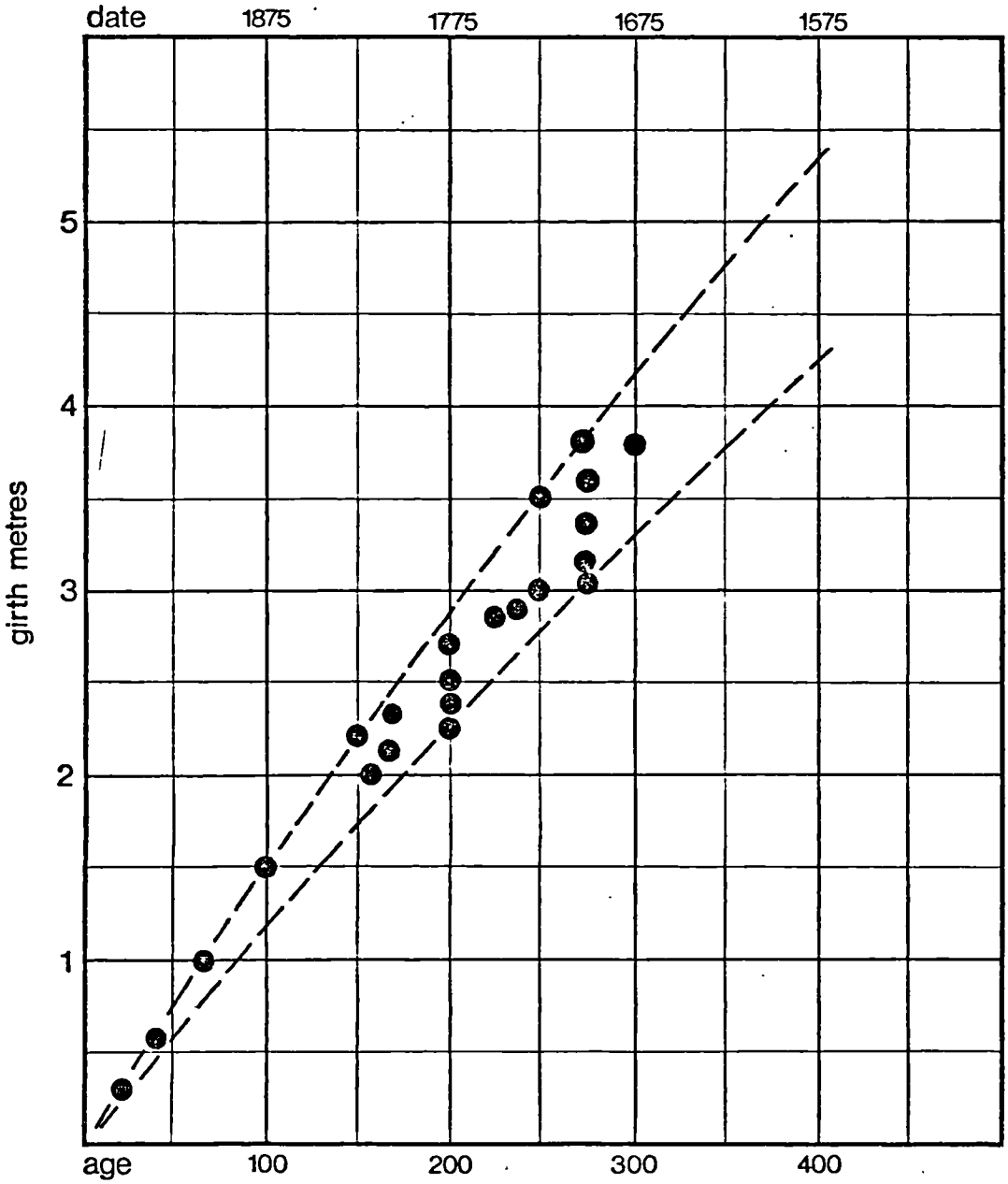
Since the authorities answering Lord Glenbervie's questions (1807) state that timber became usable for the Navy at 100-150 years, and the survey of 1783 states that "the smallest piece of rough oak timber received at the Dock yards is 45 feet content square", it is clear from the figures just given that only the finest timber could have attained this volume in a century and a half. The density of 30-40 stems per acre is lower than that found in present-day mature oak plantation in the Forest, of 50-60 stems at 150 years. It is nevertheless a very high figure and suggests that straight timber for the Navy was made up of the finest stems. There must therefore have been a great deal of timber of similar age but inadequate volume, either left standing or felled for other purposes, which must represent part of the figure of 197,743 trees of less than 45 cu.ft. listed in the 1783 survey. In a

Addendum

Since completion of the thesis, further evidence has come to light. I am grateful to Mr. David Stagg for bringing to my notice the New Forest Planting Record (P.R.O. F24/77), a notebook which contains, among other things, girth measurements of oaks in several inclosures. In all, 83 trees were marked in 18 inclosures, eight dating from 1700, three from 1756, and seven from 1775. The girths of these trees were recorded every other year from 1814 to 1850.

Analysis of the figures shows that in the 1775 inclosures the mean growth rate for trees aged 39-57 years was 0.47 inches per year; in the 1756 inclosures, for trees aged 60-78 years, 0.54 inches per year; in the 1700 inclosures, for trees aged 114-150 years, 0.46 inches per year. The mean rate for all trees, of 1.24 metres per century, confirms the mean rate from contemporary ring counts, shown in fig.20. The low base status of New Forest soils is clearly shown by this slow rate of growth, which is half that achieved by oak on better soils elsewhere in lowland Britain.

Fig. 20 Girth–Age, Oak



letter from John Fordyce to Thomas Nicholls (see last entry Appendix 1) discussing the 1783 survey, the total figure for smaller timber is given in more detail.

There are said to be 72,990 trees from 10 to 30 feet containing 30,111 cu.ft., and 120,911 trees of 5 to 10 feet containing 28,458 cu.ft.

Nicholls in his reply to Fordyce says that there has been a great decrease in timber available for felling in the last few years, the consumption having been much greater than the growth. However this does not prove that growth is less now than in the past. He feels that the loss of large timber is due to both the greatly increased tonnage and number of ships built for the Navy and East India trades during the last 30 years. He believes the present dearth is due, not to poor growth, but to the fact that the area of woodland has not increased to keep pace with the increased demand of recent years.

The Parliamentary Reports referred to were unprecendented in scope and detail. There were 17 "Reports of Commissioners to Enquire into the Woods, Forests and Land Revenues of the Crown", from 1787 to 1793. Their task was to report on the past and present state of forests throughout England.

Among the tasks laid down by the Act of 26 George III, which set up the Commission, was the mapping and detailed perambulation of the Forest. As mentioned in Appendix 1, the Forest was surveyed in detail by Richardson, King and the brothers Driver, each covering five of the 15 walks. Each produced a coloured map of the whole of the third of the Forest surveyed, and the map accompanied a detailed handwritten survey of the acreage and condition of all the woods in the Forest. (This survey will be discussed in detail in the next section.)

It is important to note that while the three original maps provided the data for the engraved version by Faden which accompanied the 5th Report, the text of the Report, and hence all successive histories of the Forest based thereon, never mentioned the written surveys submitted by Richardson, King and the Drivers.

I think it is clear from this fact, and from the highly selective reporting of the figures contained in Nicholls's 1783 survey, that although the Commission was charged with reporting on the state of the Forest as a whole, they actually saw the question of Naval timber provision as their main concern.

The revelations of the 5th and 11th Reports achieved immediate results. In 1792 the Commons passed a Bill proposing, among other things, the inclosure of 2,000 acres a year up to an inclosed maximum of 20,000 acres. Within this total, 1,500 acres were to be used for the confinement of the Forest's deer population (Lord Glenbervie 1813).

While, such measures would in time greatly have increased the amount of timber available, and answered Nicholls's comment about the failure of plantation area to increase with demand, it was too drastic a step, and the Bill was rejected by the House of Lords. Although the successful Act of 1808 did allow the inclosure of up to 6,000 acres, not until the Act of 1949 did the inclosable total reach the figure proposed in the abortive Bill of 1792.

On the basis of the new evidence presented, I am in no doubt that the authors of the 1789 Report, like the author of the 1632 Remembrance listed in appendix 1, put forward a highly selective view, whose bias was designed to persuade those in authority to introduce legislation to alleviate those problems which they had so forcefully pointed out.

While acting, quite understandably, in their own interest, those authors have unwittingly laid the foundations of a distorted historical view. Writers like Oppenheim, Lewis and Wise, by referring to published reports rather than the original documents, which have only just come to light, have handed down to us, through the work of successive authors, a view whereby the scarcity of timber suitable for the Navy during the 16th, 17th and 18th centuries has been taken as a measure of the state of degeneration of the Forest as a whole.

4. THE PAST MANAGEMENT OF PARTICULAR WOODS

In this section I shall discuss the past management of all those coppices, inclosures and woods in the Forest about which definite information can be gleaned from the documents presented in Appendix 1.

COPPICES

Coppices are listed in chronological order according to the first reference to each in the documents.

It is clear from the wording of the Taverner survey (e.g. Stubby) that his acreages refer to the wooded area and not the total area of the coppice. Norden's 1609 survey confirms this, as he gives acreages and the length of fencing round the coppice, and these frequently disagree (e.g. Northwood, where the wooded acreage given is just over half the total coppice area). It is clear from this that early coppice surveys listed only timber acreages and that they should not be taken as a guide to total acreage of a particular site.

Since many of the coppice banks are clearly traceable on the ground today and are recorded on the Hants Field Club Archaeological Map, I

have given, where possible, a rough estimate of the total area of each coppice in the heading. Norden, in his 1609 survey, uses perches of 18 and 16½ feet. References in this section will be to 16½-foot perches.

1438 Rampnore (Ramnor) Coppices (SU 31/04)

The order to cut and sell 100 acres of these coppices is the only time they are referred to. The entry suggests that the total area was 150 acres.

It seems likely that these coppices were centred round the present-day King's Hat (SU 307055), an area of high canopy Quercus petraea woodland containing a number of old banks, not yet recorded. On the 1789 map, King's Hat appeared in what is now Park Hill Inclosure (SU 311056), the present-day Ramnor Inclosure was called Green Pigsty, and the present-day King's Hat was called Cockroad Hill, the name given to the highest point within what was then called Ramnor Wood.

1535 Godshill (SU 17/16) 80 acres

This coppice is said to have been a plantation of oak in 1535. The fence length given of 10 furlongs would enclose approximately 60 acres.

1565 Goddeshill Sherewood, listed by Taverner as 80 acres set with oak and hazel.

1594 Ambrose Snellgar illegally felled 260 oaks part timber and part firewood, presumably oak standards with an understorey of young oak.

1609 It appears in Norden's coppice list.

1660 Godshill Wood listed as very prosperous.

1787 "Godshill Wood originally one of the finest woods in the Forest but at present not a single tree left."

Today the area which contained this coppice is coniferous plantation. The possible location is discussed below (see 1594 Castle Hill).

1565 The following nine coppices are first recorded in Roger Taverner's survey of 1565.

Old Bemley (South Bentley, SU 23/13) 50 acres

One of only three early coppices whose original shape is retained by the modern inclosure of the same name.

1565 listed by Taverner as being 30 acres with underwood of 34 years growth.

1585 Underwood, then aged 52 years, sold for £27.17.2.

1594 Rights to wood and underwood granted to Augustin Hill for 21 years (30 acres).

1609 Listed in Norden's survey with the same outline as today, containing 48 acres of old low oaks.

1660 Listed as very prosperous.

1787 Inclosed and planted 100 years ago. Thick with close tall oak and beech in need of thinning.

Today this mixed oak/beech planting remains in roughly three-quarters of the Inclosure, the north-eastern quarter being Douglas Fir planted in 1967.

Young Bemley (North Bentley, SU 24/13) 70 acres

1565 Listed by Taverner as 30 acres of 16-year-old underwood.

1594 Leased to Augustin Hill for 21 years as above.

1609 Listed by Norden in his survey as 58 acres of low old oaks.

1660 Listed as very prosperous.

1787 Entry is the same as for South Bentley, planted 1700.

North and South Bentley are two of the coppices which Elizabeth Bagshot helped plant as a child around 1700. Today the inclosure, which retains its original boundary, except at the north-west corner, is planted with various species of spruce and pine. Along the north-eastern side is a narrow strip of the former oak/beech stock planted in 1700.

Brodstone (SU 17/16) 40 acres

1565 Listed by Taverner as 40 acres of hazel and shrubbed oak of 27 years growth.

1583 Coppice sold by John Stockman for £25.5.6.

1594 Leased to Augustin Hill for 21 years (40 acres).

1597 600 timber trees felled in Brodstone and Castle Coppices.

1608 Confirmation of 1594 lease.

See 1594 Castle Hill for a discussion of the site of this coppice.

Hocknoll (Ocknell, SU 24/11) 45 acres

1565 Listed by Taverner as 30 acres of 36-year-old underwood.

1573 The coppice hedged and ditched.

1609 Given as a coppice in Norden's list.

1660 Said to be prospering, but Hocknell Wood decaying.

1787 248 acres inclosed 12 years ago with a ditch and bank, but through neglect in the sowing of acorns or in letting animals in after sowing, there are very few saplings. This inclosure date and area is confirmed by the original inclosure map of 1771 (P.R.O. MPB/45(3-6)).

Today the original coppice bank is still visible, occupying most of the south-east corner of the inclosure. The former coppice area contains sessile oak and beech planted in 1775, while many of the oaks outside the former coppice area are older.

Ironshill (SU 32/03) 90 acres

1565 Listed by Taverner as 110 acres, of which 50 acres have lately been destroyed, and 60 acres of coppice of 40 years growth.

1572 Said by Keeper to be well preserved.

1582 Underwood sold for £25.5.6.

1609 Sumner's transcript of Norden's survey incorrectly places this coppice north-east of Lyndhurst (SU 31/09). It is clear from the documents in appendix 1, that this coppice was in South Bailiwick. Norden's map shows it as being surrounded by a quickset hedge only, but he mentions that it had formerly been ditched about, and this bank and ditch is still visible today, and was probably in existence in 1565 when Taverner surveyed it.

It is listed by Norden as 82 acres of low pollard oaks with some sapling oaks and thorns.

1660 Listed for the first time as New Coppice, very prosperous.

1787 New Coppice (89 acres) which "Was formerly a remarkably fine wood full of Navy timber but now the whole is nearly cut. All that is left is a few scrubby trees and some young beech. Full of old oak stumps."

Today this old coppice bank is entirely contained within New Copse inclosure and is an area of mixed plantations. Roughly half is mixed oak/beech wood planted in 1808 and the rest is spruce, pine and larch.

Lynwood (SU24/14)

1565 Listed by Taverner as 33 acres of fair young timber oaks. This is the only reference in the documents to this coppice.

I have traced part of the bank of this old coppice, which lay between the west and central streams of the Three Waters and the road, occupying an area of at least 40 acres (SU 24614l4).

Northwood (SU 17/16) 95 acres

1565 Listed by Taverner as 27 acres of hazel and oak.

1593 Coppice, given as 49 acres, sold; underwood and 240 oaks. Coppice hedged and ditched.

1594 "Ellis Smyth hath digged oken roote of a years growth", suggesting that the area was seedling planted in 1593 after felling.

1609 This coppice, which was in Godshill Bailiwick, is mistakenly taken by Sumner, in his transcript of Norden's survey, to be

Norley Wood (SZ 35/98). It is given as 67 acres of good hazel and willow, the rest being oak of poor quality. Fortunately, in this case, Norden gives the fence lengths of the sides. The straight side, forming the outer forest boundary, is 200 perches, and the remaining perimeter 273 perches, an area containing more than 90 acres. The position of this coppice is discussed under 1594 Castle Hill below.

Stubby (SU 33/04) 55 acres

1565 Taverner says partly set with great oak timber, 40 acres.

1609 Listed by Norden in his survey as 54 acres containing a few pollard oaks and poor thorn.

1660 Said to be prospering.

1787 Listed as being full of small beech and a few large oak, many large trees having been felled for the Navy a few years before.

Norden lists it as being surrounded by a fence only, which may explain, first, why there is no bank traceable in the area, and, second, why the former site is clearly delineated by a path. Comparison of the $2\frac{1}{2}$" ordnance survey with Norden's map and the 1787 map leaves little doubt that the kidney-shaped track centred around 329045 marks the approximate coppice boundary, with the exception of the eastern lobe.

Today in this eastern lobe (333043) there is a remnant of the beech planted in 1865. The main area consists of blocks of oak and beech planted in 1829, and more recent blocks of Douglas Fir and beech.

Wootton (SZ 24/99) 180 acres

1565 Listed by Taverner as 140 acres which have been completely destroyed.

1609 Listed in Norden's survey as 128 acres of young sapling oak of 20 years growth to be left to grow into timber. Also there are many vacant places, which explains the discrepancy between his acreage and the total area.

1660 Listed as being full of good young timber.

1787 "... is good land and has produced as many oak as any other place in the Forest of the same number of acres, but a small quantity now remains."

The bank and ditch along the north and east sides and south side of the eastern lobe all exist today. There is also 100 metres of the bank running NNW at 244994, which confirms that Norden's map is accurate and that his south side ran some way inside the present inclosure.

Nothing remains of the oak cover cleared at the end of the 18th century. Today it contains blocks of oak planted in 1808 and more recent plantings of oak and various conifers.

1566 Gatewood (SU 43/01) 60 acres

1565 Listed by Taverner as 60 acres utterly destroyed by John Harrison. Not referred to as a coppice.

1566 Given as one of a number of coppices in which abuses had occurred.

1585 Payment for mending Gatewood Coppice hedge.

1787 Gatewood Hill, of 57 acres, is part common and part pasture.

Today it remains open common except for a small area of wood at SU 434012, uneven aged oak and birch.

1570 Stockley (SU 34/02) 70 acres

1570 "Stockeley Coppice died the winter before."

1572 Coppice spoiled by deer and cattle intrusion, implying that it had been replanted after 1570.

1609 Listed in Norden's survey as 49 acres of thorns and willows and a few loppable oaks, but as soil is good it should make a good coppice. His map shows a surrounding bank, but this has not so far been traced.

1660 Stockley Wood listed as prosperous.

1787 "... formerly a very fine wood but now mostly felled for the Navy, particularly in the middle."

Today the former coppice area is very roughly followed by the drainage channels surrounding the plantation blocks of 1852 oak and more recent pine. However, a remnant of the old oak coppice remains along the south-east side of Lady Cross Lodge grounds. This triangular area, centred around 42027, contains many even-aged oaks (Q.robur) with girths ranging from 2.90 to 3.20 metres, probably planted around 1700.

1572 Sloden (SU 21/12) 67 acres

1565 Not called coppice by Taverner, but listed as 30 acres set

with ash, holm and thorn.

1572 Certificate of the Regarders says Sloden, containing 47 acres and 12 acres of void ground, sold for £63.9.4, part of which paid for hedging and ditching. Since this price is too high for underwood, some or all of the ash recorded by Taverner must have been felled. As Sloden is not listed as a coppice by Taverner, but is so called by Norden and is ditched, it seems likely that 1572 is the date of the Sloden Coppice bank and ditch, which is marked as an earthwork on the 2½" ordnance survey. Sumner, in "Local Papers", p. 173, suggests that encoppicement took place either during the reign of Henry VIII or in 1570 in Elizabeth's reign.

1609 Listed by Norden, in his survey, as 67 acres of holly, white and black thorn, many young sapling oak and ash growing up through the bushes, and many vacant places.

1771 Sloden Inclosure formed, 279 acres.

1787 "Upper part of the inclosure is covered with yew, holly, thorn and in some spots a good sprinkling of oak and ash which require thinning."

Today the ancient coppice area still contains yew, holly and thorn under a canopy of oak and ash planted in 1864. In the southern part, around 215125, are a number of oak of 2.60 to 2.90 metres girth, remnants of the original inclosure planting. Also there are a few 3.50 to 4.0 metre oaks, examples of the late Stuart A2 generation discussed below.

1574 Bradley (Broadley SZ 25/99) 45 acres

1574 The earliest reference is to the illegal felling of 200 timber trees of oak and ash in this coppice.

1609 Listed by Norden in his survey as 23 acres of wood of about 20 years growth, the coppice being surrounded by an old ditch.

1660 "Very good young timber and prosperous."

1787 The coppice is listed in this survey, but is included with Broadley Wood and Sheepwash Lawn as 173 acres of oak, heath and pasture.

The bank and ditch round this coppice still exist. They occupy the southern part of the present Broadley Inclosure (252988), an area containing blocks of oaks planted in 1860 and more recent conifers.

1575 Ruye (Roe SU 20/08)

1575 Mentioned in the Certificate of the Regarders as being unharmed that year.

1660 Listed as prosperous.

1700 William Stede's map of the 1700 inclosure of Reaw (P.R.O. MPB/45(1)) shows an area of 92 acres, which is unchanged to this day. Roe Wood Inclosure, as it is now called, contains one small block of oak planted in 1811, the rest being much younger blocks of oak and conifers. As there is no record of the acreage of the old coppice, it is impossible to say whether the area inclosed in 1700 was the coppice, (but see Roe Inclosure in next section).

1575 Ayshers (Ashurst, SU 34/09) 54 acres

1575 Repairs to hedge round Ayshers Coppice.

1660 Listed for the first time as New Coppice and said, together with Ashurst Wood, to be prospering.

1787 Listed as New Coppice. "Great quantities of Navy timber have been cut and sent to Portsmouth. Last cutting 1786 has nearly cleared the whole. There is a great number of beech, some young and some very large, but no young oak."

Today the bank and ditch can be followed right round this coppice, whose eastern and southern banks form the bounds of part of Church Place Inclosure. The area has recently been cleared and planted with coniferous seedlings. The remains of the beech referred to in 1787 can be seen in the large number of stumps up to 3.50 metres in girth. One old pollard beech remains in the north corner of the old coppice (343102).

1590 Ridley (SU 20/06) 50 acres

1565 Listed by Taverner as Ridley Wood, 20 acres of old oaks which have been topped.

1590 30 acres of underwood sold by Woodward. Coppice hedged and ditched this year (probably for the first time).

1592 Young coppice damaged by animals let in.

1609 Listed by Norden, in his survey, as 72 acres of old lopped oaks with hazel and thorn, also many young sapling oaks to be left for timber.

1660 Very prosperous with young timber.

1787 Once again called Ridley Wood; beech and some good oaks.

Today this wood, in which there is very little oak, is dominated by beech; many of the older specimens are pollards.

Sumner, in the postscript to Norden's survey, quotes the following passage from Lascelles's "Brief History of the Arboriculture of the New Forest": "A.D. 1571, presentments were made against the tenant of Ridley Coppice for shrouding 200 trees." Sumner assumes that the pollard beeches standing in his time, some of which remain today, were those mentioned in 1571. This seems most improbable, first, because they would now be approaching 500 years in age, and, second, because the documents show quite clearly that the wood has changed over the last 500 years from oak to beech. Support for the improbability of the Ridley beeches dating from the 16th century, comes from the fact that a pollard beech of 4.30 metre girth is growing in the 1670 coppice bank at Holm Hill Inclosure (SU 256089). This tree, which is as big as many of the pollard beeches in Ridley, must date from between 1670 and 1698, the date of the Act forbidding pollarding, which Tubbs suggests (1968, p. 131) was widely observed.

The Forestry Commission study of British Beechwoods found no stand older than 250 years. "There are doubtless many park trees considerably more than 250 years old, but certain records appear to be few, and it is likely that beeches more than 300 years old are exceptional." (Brown 1953)

1594 <u>Castle Hill (SU 17/16) 55 acres</u>

From the documents in appendix 1 it will be seen that this coppice is variously known as Castlehill, Cattlehill, Catshill, Woodball

and Woodhall.

1565 Taverner refers to it as: "Woodhall thyn set with oaks which have been topped. 50 acres."

1594 It is first referred to as a coppice in its lease to Augustin Hill.

1597 600 timber trees felled in Brodstone and Castle Hill coppices.

1609 Given as a coppice in Norden's list.

Godshill Coppices

From Taverner's survey, and later documents, there can be no doubt that there were,concurrently, four coppices in Godshill Bailiwick. A. H. Pasmore has recorded banks in the Godshill Inclosure area which, in the light of the new documentary evidence, can now be positively identified, as Northwood, Godshill and Castlehill Coppices. Pasmore and I have carried out further searches in the area to find Brodstone Coppice, so far without success.

Norden, in his survey, gives side lengths of Northwood Coppice. The straight side, which he says borders on non-Forest grounds, is 200 perches (1,100 yards). This corresponds exactly to the distance AB on fig. 21. The curved side on Norden's map (see fig. 22, which is a copy of Norden's map of Northwood Coppice), follows very closely the bank which today runs along the base of the steep northern slope of the stream. Norden's map shows the corner of another coppice at the south-west corner which is consistent with the known position of the coppice south of the stream. His map also shows a path running along the straight side as does the 1787 map, where today the road runs along the

Fig.21 Godshill Coppices scale 6"/mile (for location see fig.28)

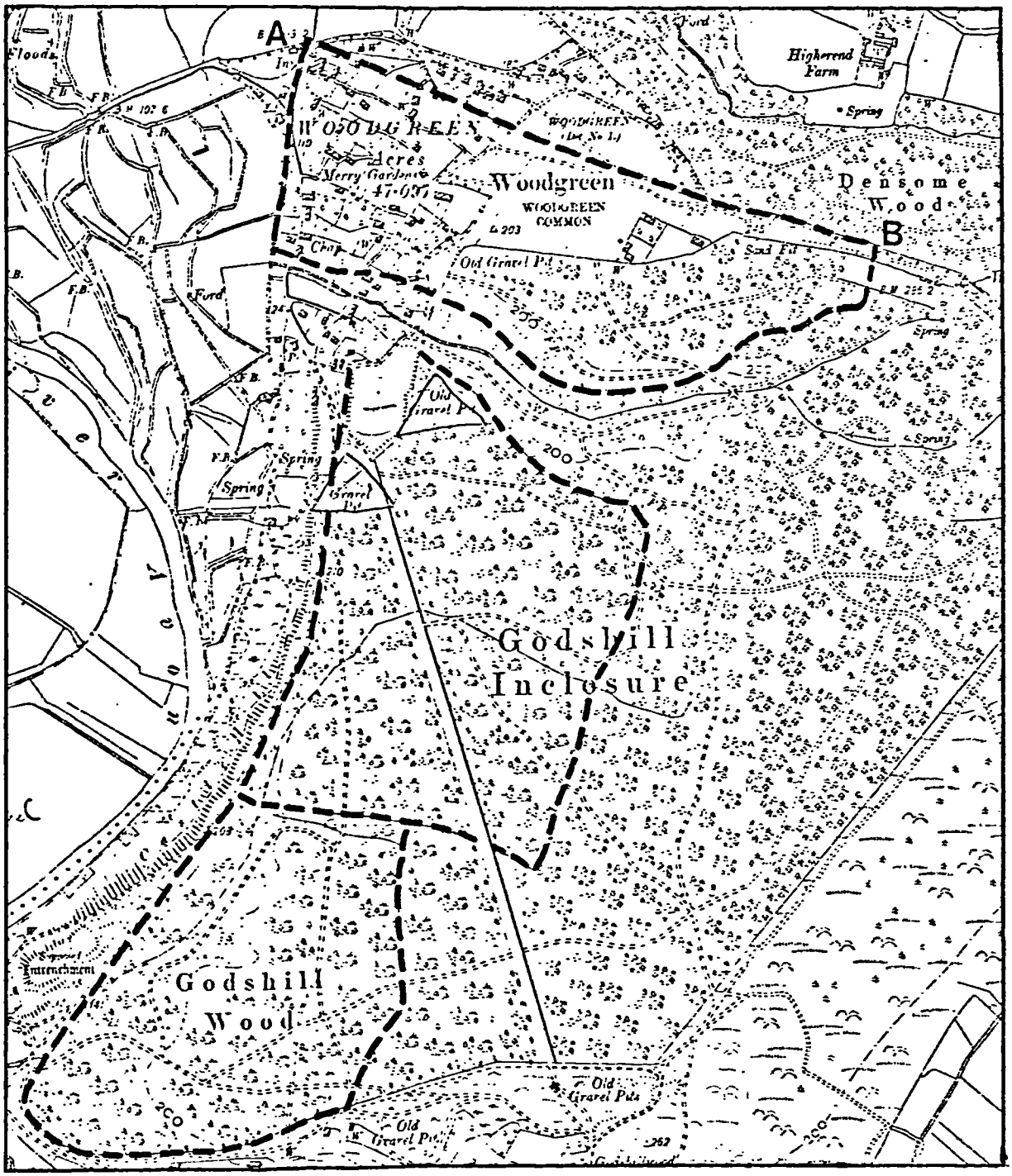
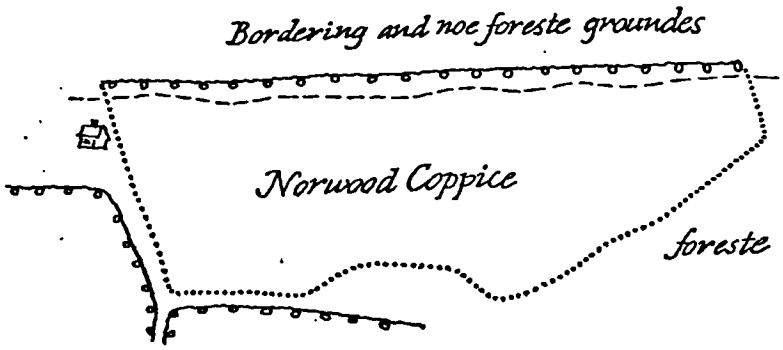


Fig. 22



north side of Godshill Inclosure. The private encroachments around the green now lying inside the former coppice area are known to be later than 1800. Finally, Northwood Coppice was the northernmost wood in that part of the Forest. The medieval bank, marking the Forest boundary at that point, ran between Northwood and Densome Wood.

The southern area shown on fig. 21 must be Castle Hill Coppice. It is the correct size and lies next to Castle Hill which has been so called on all available maps of the Forest.

The middle area I take to be Godshill Coppice, because of its size. The area contained within the recorded bank is very roughly 80 acres, which agrees with Taverner's record of Godshill, but is twice the size of Brodstone. Names in the Forest, where they have persisted, seldom change position, so the placing of Godshill Wood along the east side of the former coppice (SU 176166) on the 1787 map, also suggests that it was Godshill Coppice.

1598 Sett Thornes (SZ 26/99) 90 acres

1565 Listed by Taverner as 100 acres of holms with a few oak, not a coppice.

1596 The wood referred to by Taverner was illegally felled (see appendix 1) and the area encoppiced by William Christmas.

1609 Given by Norden in his list.

1787 The coppice is no longer listed separately at this date, Sett Thornes being part of a 321-acre area of oak and heath.

Today part of the old coppice bank can be traced just outside the western edge of the modern inclosure, but the rest is yet to be found. The inclosure today consists of blocks of oak planted in

1811 and blocks of conifers and sweet chestnut planted this century.

1608 King's (SU 42/01) 60 acres

1608 Christmas felled 30 to 40 great trees and 200 saplings within and without the ditch round King's Coppice.

1660 Listed as prosperous.

1787 Listed in the survey as 78 acres full of fine thriving oak, some big enough for the Navy. From this it is clear that the coppice was well stocked when Christmas committed the offences in 1608. The 1787 map shows the former coppice clearly as being that part of the present-day Inclosure lying on the southwest side of Dark Water.

Today none of the former cover remains; there is some 1818 oak, the rest being 20th-century mixed deciduous and coniferous planting.

1609 Amley Thornes (SU 23/00) 45 acres
Munckton Wood (SU 24/00) 90 acres
Wilverley (SU 24/01) 80 acres

These three adjoining coppices are listed by Norden in his survey.

Amley is described as old dispersed thorns and a few old pollard oaks. From the discrepancy between his acreage of 30 and the estimate above, it is clear that only about two-thirds was wooded.

Munckton Wood is listed as 88 acres well set with old thorns,

pollard oaks and sapling oak.

Wilverley is given as 40 acres of old thorn covering only half the acreage of the coppice. This is referred to on Norden's map as the north part of Wilverley and from the complex of banks around Wilverley Lodge (SU 250004) there may have been another coppice to the south-east, not listed in any of the documents so far seen.

The banks round these three coppices, as mapped by Norden, still exist within Wilverley Inclosure; nothing remains of the former cover. The inclosure is surrounded by a facing of 1808 oak within which lie more recent deciduous and coniferous blocks.

1609 Holmsley (SU 22/00) 106 acres

1565 Listed by Taverner as a wood of 60 acres of holm, thorn and oaks of great age.

1609 Listed in Norden's survey as 106 acres of old holly and some sapling oaks. He makes no mention of the old oaks referred to by Taverner.

1787 This survey no longer lists the coppice.

So far only part of the bank has been traced, but it seems likely that Holmsley Coppice lay mainly outside the north-west corner of Holmsley Inclosure on what is now Calluna heath.

1681 and 1682

The Certificates of the Regarders for these years record the inclosure of 400 acres of land to make coppices, 100 acres at Holm Hill and 300 at Aldridge Hill and Holidays Hill. Although they

are referred to as coppices, they were in effect the first inclosures, and are therefore dealt with in the next sub-section.

1787 The 1787 survey lists a number of coppices of which there is no previous record, but whose inclosing banks are still traceable today.

Beaulieu Thorns (SU 33/02) 14 acres

Although the 1787 map shows it in a wooded area, the survey lists it as containing only a few holly. Bank visible in what is now the open heath of Hatchet Moor.

Hoe Beech (SU 32/09) 30 acres

The wood is listed in the 1787 survey as good oak and beech, much having been felled. It is not referred to as a coppice or inclosure, but the surrounding bank is still visible. It is today dominated by beeches, many of which are old pollards.

The Rails (SU 27/12) 20 acres

The 1787 survey refers to this as a former inclosure, and the bank, which is still visible, surrounds an area lying on the north and west sides of Malwood Farm. The area north of the farm (SU 275127) still contains some of the A2- generation oak canopy.

Finally there are those areas which still have traceable surrounding banks, but of which there is no record of encoppicement or inclosure.

Dark Hat (SU 232159) is surrounded by an incomplete bank, which suggests that it was the north-west end of a coppice of at least 25 acres.

Matley Wood (SU 333078) is almost completely surrounded by a bank.

Small segments of probable coppice bank have been recorded at many other places, e.g. Berry Wood (SU 216055), Islands Thorns (SU 215157), Studley Wood (SU 226161), and Pinnick, which is of particular interest.

The eastern and highest part of Pinnick Wood (SU 197078) is situated on a gently sloping shoulder affording good drainage. It is a typical coppice site and contains what may be the only remaining example of true coppice timber management in the Forest. It consists of a number of open-habit A1-generation Quercus robur of remarkably even age (girths: 4.20, 4.20, 4.40, 4.60, 4.60, 4.60 metres) interspersed with trees of 3.20 to 3.60 metre girth. Some are planted in lines, and there is still enough evenness of spacing to suggest that the trees were either thinned or originally planted at a distance of roughly 50 ft between stems, giving 16 to the acre (see fig. 1, frontispiece). Some of the oaks have screen hollies round them (e.g. second from right, Quercus robur girth 4.20 metres, with Ilex girth 1.0 metre), but the area has no understorey. There is a fragment of bank and ditch at SU 199076, but so far the exact extent of this former coppice is uncharted.

Discussion

The documents in appendix 1 show that by 1600 the total acreage which had been encoppiced at some time before that date was 1,370.

I have already suggested that Taverner's survey of 1565 was not a survey of all the woods of the Forest, but merely those, including coppices, in which some form of management had been practised. If this was the case, then the total acreage under some form of management at that date exceeded 5,000 acres. Within this area were a few beech

woods, but most were pure oak or oak with some beech. The understorey, where mentioned, was usually holly and thorn, and occasionally hazel.

Norden's survey of 1609 gives a similar picture of the early coppices; most often old pollard oaks with hazel or thorn. He does not mention beech as being present in any of them.

In his coppice list (see fig. 6) he gave 34 sites fit for coppicing. It is interesting to note that 27 of these sites appear in Taverner's survey, probably sites already being tended, but which would profit by inclosure and more intensive management.

With the exception of the north part of Stockley and The Rails, every one of the ancient coppices was sited on a shoulder or ridge, affording good drainage. Frequently the lower bank lies just upslope from an area of poorer drainage, and in many cases the contours of the site chosen, in part determined the irregular shape of the coppice, e.g. Ocknell, Matley, Stubby, Amley and Monkton. The same applies to almost all the sites fit for encoppicement in Norden's coppice list, e.g. Hasley, Knightwood, Puckpits, Brackley, Studley Head.

The next record, that of 1660, lists 58 woods and describes 43 as being prosperous or very prosperous, and 15 as decaying. Of the 58 places mentioned, no less than 47 appear in the preceding documents. This strongly supports Tubbs's view that this list of demesne lands was in fact a list of "all those sites known at the time to have been encoppiced at some period, and where, therefore, the precedent had been set for future enclosure."(Tubbs 1964, p.101)

The preceding coppice details show that during the 17th century the acreage increased by 456, bringing the total to 1,826 acres by 1700. It seems unlikely, therefore, that the 1660 list represents coppices only.

I should suggest, rather, that, like the Taverner survey, it lists all managed areas, both coppices and managed uninclosed woodlands. As Tubbs points out, the large number of prospering woods listed in 1660, many of them young, is evidence of the replacement of the heavy felling of the Stuart period. Nicholls's survey of 1783 also shows it, in the figure of 193,905 oaks from $7\frac{1}{2}$ to 45 feet. Today, this oldest generation of oak, referred to as the A-generation by Tubbs and Peterken (1965), can be seen in many of the uninclosed woods.

If, to the figure of 1,826 acres, are added those coppices round which banks exist, the estimate of total coppice acreage is over 2,000. Many of the formerly managed areas, including coppices, now lie inside the statutory inclosures. Of the 5,300 acres listed by Taverner, approximately 2,800 acres are inside inclosures, 400 acres are heath, and the remaining 2,100 acres are in the uninclosed woods. Since old coppice banks are still being discovered, the total figure of known managed areas must be regarded as an underestimate. Therefore, somewhere between a third and a half of the 6,000 acres of uninclosed woods remaining today had experienced some form of management before 1700.

Of the coppices documented above, only Sloden and Stockley, and of the undocumented, Dark Hat, Matley, Pinnick and The Rails, retain any of the late 17th-century oak cover. Of the remainder, those which are not 19th- or 20th-century plantation have undergone the change from oak to beech found in so many woods. This is well documented in the cases of Ashurst, Ironshill and Ridley. However, that these ancient coppices have all been oak or oak/beech areas in the past, is indicated by the presence of the associated ground species Ruscus aculeatus and Euphorbia amygdaloides, normally only found in abundance in uninclosed oak-dominated woods. With the exception of the Godshill coppices,

which have been severely disturbed, the association is present in every one of the former coppices presently covered by wood as opposed to heath. At Stubby (SU 329045), it even persists in the darkness of a 25-year-old Douglas Fir plantation.

INCLOSURES

At some time during the middle of the 17th century the coppice system gave way to the practice of inclosure. This was really a change in terminology because, as noted earlier, the management of coppices for underwood had ceased to be profitable during the 16th century, and those ancient coppices still in existence during the 17th century were, in practice, inclosures.

Felling during the reign of Charles I and the Commonwealth had stripped the Forest of most of its mature oak. Continuing demand stimulated new inclosure and on 17 December 1669 a Treasury Warrant was issued to Sir John Norton for the inclosure of 300 acres, 100 each at Priors Acres, Dunstone Heath and Holm Hill (Extracts from the Swainmote Court, Book I 1665). In the event only one of these sites was used. A communication dated 14 June 1671 (Calendar of Treasury Books) states that two of the proposed sites, Priors Acre in North Bailiwick, and Dunslow Heath in Inn Bailiwick are inconvenient. Therefore Holidays Hill and Aldridge Hill are to be inclosed instead. The Certificates of the Regarders from 1681 and 1682, as noted in the previous section, record the inclosure of these three coppices totalling 300 acres. Tubbs (1968, p. 153) cites the Return of the Regarders for 1670 and 1673 as recording the inclosure of 100 acres at Holm Hill (SU 258087) and a further 300 at Aldridgehill (SU 278032) and Holidays Hill (SU 267074).

Although referred to as coppices these are the first inclosures in the

Forest. The banks round all three remain today and they show that only half the authorized acreage was actually inclosed. Holm Hill was 100 acres, but Holidays Hill, listed in the 1787 survey, was only 48 acres and Aldridge Hill about 50 acres. Holm Hill is listed by Norden in 1609 as a place fit for encoppicement, but the other two do not figure in any of the earlier documents.

Inclosures so-called began with the Act of 9 and 10 William III cap. XXXVI, 1698. This Act, which stated that "The Forest was in danger of being destroyed", authorized the immediate inclosure of 2,000 acres, for the production of timber for the Navy, with a further 200 a year for 20 years thereafter, and forbade lopping and charcoal making within the inclosures.

1700 Inclosures

Aston Hill and Woodfidley (SU 34/04) 294 acres

1565 Woodfidley was listed by Taverner as 100 acres set with oak.

1787 "Woodfidley Old Inclosure - a fine young wood, supposed to have been planted 70-80 years ago. Tall thriving oak and a few beech." Appendix 22 quotes Elizabeth Bagshot as having helped plant it with acorns when a child.

Today, although the 1700 bank remains, only a small block of the original stock is left and it is beech, the oak having been removed long ago (SU 346046). Elsewhere there is some 19th-century oak and more recent conifers.

Burley Sandys (SU 24/04) 122 acres

1565 Listed by Taverner as Sandish, 80 acres of oak timber and some beeches.

1615 This same wood appears in Thomas Hurst's list of oaks marked for felling (see appendix 3). Sandhurst, judging from Taverner's survey, extended east of the A35 into what is now Rhinefield Sandys Inclosure. In Hurst's list it yielded the largest number of oaks in the bailiwick.

1787 Burley Inclosure, mixed oak and beech.

Burley Old Inclosure was thrown open at some time in the 19th century. It is shown as disinclosed on the Inclosure map of 1875 (P.R.O. MPE/1313). Some time later it was reinclosed, but has not changed from the mixed oak/beech wood recorded in the past. Today the closed canopy is two storey, the A-storey dating from the original inclosure, and the B-storey dating from the middle of the 19th century. There is only one tree, a decaying Quercus robur of 5.0 metres girth at SU 247041, which clearly pre-dates inclosure.

Danes Hill and Priors Acre (SU 25/13) 135 acres

1565 Both listed by Taverner as set with oak, 38 acres in all. Today both areas, with their enclosing bank and ditch, are entirely contained within King's Garn Gutter Inclosure (1860). A small area of old beech remains at SU 251135.

Long Beech Hill (SU 26/05) 176 acres

This is the original name of what was later called Rhinefield Old Inclosure and which today lies in Vinney Ridge Inclosure.

1565 Younge Beech Hill listed by Taverner as 30 acres of oak and beech.

1615 Long Beech Hill is listed by Hurst as one of the woods providing

a large number of oaks for felling.

1660 Listed as Rinefield Wood, and said to be decaying, which would explain its choice as a site for inclosure in 1700.

1787 Listed as the Old Inclosure, Rhinefield Walk, set with oak of 50 years growth, in need of thinning.

Today this former inclosure contains oak planted in 1859 and various more recent coniferous plantings.

Puckpits (SU 25/09) 77 acres

1565 Listed by Taverner as 20 acres set with oak.

1615 Listed by Hurst as providing 27 oaks for felling.

1787 Listed as 80 acres of oak and beech. It is stated as being "an old inclosure full of flourishing young oak", which clearly refers to the planting carried out with inclosure. Planted by Elizabeth Bagshot as a child (see Aston Hill and Woodfidley above). Today this old inclosure contains only beech with the exception of a few of the earlier oaks, probably 1700, in the north-west corner. This is a comparatively recent change from oak to beech through selective felling.

Reaw (SU 08/21) 92 acres

1660 Rew Wood is listed as prosperous.

1787 Roe Inclosure: "a very old inclosure of which the ditch can still be traced. Some very good large timber fit for the Navy, but few young trees. Many vacant spots which should be replanted." As with Burley Old Inclosure, existing mature oak wood was inclosed for further production, which strongly suggests that the whole of the old coppice,

mentioned in the previous sub-section, was inclosed in 1700.

Today this old inclosure still exists in outline but lies within the larger Roe Inclosure, which is all recent oak or coniferous plantation.

Salisbury Trench (SU 25/14) 100 acres

1565 Taverner does not list this area by name, but there can be no doubt that it is included since he records 500 acres of oak wood north of the South Trench, i.e. the Trench running east from Danes Hole to King's Garn Gutter.

1660 East Linwood decaying. As with Long Beech, this would explain its inclusion among the 1700 inclosures.

1787 "Inclosed and planted 100 years ago. Full of tall slender oak in need of thinning."

The area of Salisbury Trench is the same today as in 1700, but little of the former cover remains. The present inclosure contains recent oak and conifer planting with an edging of 1700 and 1775 oak on the north, east and south sides, amounting to about four dozen trees in all.

The seven inclosures made in 1700 total 996 acres, a figure which disagrees with the generally published figure of 1,022 acres which was given in the Act of 48 George III cap 72 (1808). The inclosures listed as having been made under the 1698 Act were: Woodfidley, Burley Sandys, Priors Acre , Long Beech, Puckpits, Salisbury Trench, and North and South Bentley. Notice that Roe was left out and North and South Bentley included, which brought about the erroneous total of 1,022 acres for the 1700 Inclosures.

This may have come about from the reference, in Appendix 22 to the 5th

Report 1789, to the two coppices having been planted in 1700, together with Puckpits and Woodfidley, by Elizabeth Bagshot. There is no doubt that they were so planted, as much of the stock remains in South Bentley and a little in North Bentley today. However, since the 1698 Act called for the inclosure of waste lands, North and South Bentley would not have been inclosable under the Act, being already existing woodland, and were therefore listed by mistake.

1756 Inclosures

In 1751, 24 George III, an order was issued to Phillipson, Surveyor General of Woods, to inclose woods totalling 300 acres. In the event, only 252 acres were actually inclosed, in 1756 (acreages from the 1787 survey).

Black Bush (SU 33/04) 40 acres.

1787 "Inclosure, formerly surrounded with quicksett hedge, is now full of gaps. A few stunty oak and birch only."

Today this lies within the much larger Denny Lodge Inclosure, which was inclosed and planted in 1861. The Black Bush area contains mainly Scots Pine and oak from 1861.

Etherise (SU 32/05) 112 acres

1787 "Although this is an old inclosure, there is no timber at all in it, only a few old oak and beech in the corner adjoining Denny Wood, but in the middle there is not a single tree."

Like Black Bush, Etherise was completely replanted with the creation of the much larger Park Hill Inclosure, in 1855. Today a few blocks of the 19th-century oak, pine and larch plantings remain, but most of the

former inclosure area has been cleared and replanted with conifers since the Second World War.

Pignal (SU 31/04) 100 acres

1660 Pignell is listed as decaying.

1787 "Land is deep clay, very cold and wet. The oaks are thin and very scrubby and in several acres there is not a single tree. Of the whole which was planted with acorns, the wet areas have failed completely due to lack of drainage."

Pignal was replanted in 1880, with oak and Scots Pine, some of which remains, although part has been cleared and replanted with pine since the Second World War.

Lord Glenbervie in his notes (1813-23) quotes the Duke of Bedford, then Lord Warden of the Forest, as saying that the 252 acres inclosed in 1756 were sown by strewing acorns into ling. Bedford had tried to stop the inclosures by Phillipson on the ground that there were outstanding charges for delinquency against him. Phillipson was succeeded as Surveyor General by Sir Edmund Thomas, who was issued with a commission in 1766 to inclose a further 400 acres, but he never acted upon it. Thirteen years after the 1756 inclosures, the Duke of Bedford could not find a single oak growing, so he had the 252 acres ploughed and sown with oats, to be resown later with acorns. This plan was opposed by Thomas, but Bedford prevailed. Unfortunately the Duke died in 1770 when the job had just been started, and three-quarters was never sown and remained waste.

By 1770 only 1,250 acres had been inclosed under the Act of 9 and 10 William III which had authorised the immediate inclosure of 2,000 acres

in 1698 and 200 acres a year thereafter. Glenbervie puts forward the view that the Act was not implemented because rolling inclosure had seemed to be legally contingent on earlier inclosures being thrown open, and as he had never found any official statement of the fitness of any area to be thrown open, the legal way for further inclosure had thereby been blocked, in accordance with the wishes of the commoners. This view would only be tenable if the original 2,000 acres had been inclosed immediately following the 1698 Act. Since only 1,250 acres were actually inclosed, the question of whether or not the annual inclosure of 200 acres was to be rolling or cumulative was never at issue. By all accounts, the period from the 1700 inclosures until those of 1775 was one of serious neglect by those responsible for making inclosures.

1775 Inclosures

The last inclosures in the 18th century, and under the Act of 1698, were made by Pitt, Surveyor General, in 1775. They totalled 2,044 acres, bringing the acreage of the 22 inclosures made under this Act, to 3,292.

Aldridge Hill (SU 27/03) 131 acres

An enlargement of the 1682 inclosure, planted with acorns. Today it is entirely post-war oak and conifer plantation.

Coppice of Linwood (SU 24/14) 243 acres

1565 This whole area is, I suspect, that referred to by Taverner as "a plott of wood lying between the Middle Trench, set with oak. 240 acres." The 1775 inclosure also incorporated the ancient coppice of Linwood. The area was planted with oak and beech and small relics remain today.

The Keeper examined in 1787 (5th Report, Appendix 22) remembers part of Coppice of Linwood being planted with oak seedlings, not acorns.

A narrow outer band surrounds the north, west and south sides of the inclosure and a relic mixed oak/beech area runs north-west from Three Waters Bridge (SU 251114) along the ravine of the middle water to an alder carr (SU 245146), surrounded by Norway Spruce. Elsewhere, in this inclosure, conifers have been planted in among the remaining 1775 oak.

Furzey Lawn (SU 30/10) 80 acres

Although not listed by name in 1565 or 1660, this area was wooded before inclosure. The 1787 survey describes the 10-year-old inclosure as "young oak and beech with a few older trees, getting dead at the top."

Almost the whole of this area was replanted with pine and fir in the 1920s. No 1775 stock remains.

Long Beech Hill (SU 25/12) 129 acres

1565 Listed by Taverner as Long Beech Hill, 40 acres, set with oak and beech.

It is not listed again until the 1787 survey, which describes it as "good oak but thin. More should be planted." A quarter of this inclosure in the south centre has been replanted in the last decade, but the rest, thrown out in 1815, is still 1775 stock. A few areas are oak and beech, but most of it is today almost pure beech.

cknell (SU 24/11) 244 acres

1565 Both Ocknell Wood, 10 acres of oak, and Ocknell Coppice, 30 acres, are listed by Taverner.

1660 Both are again listed, the wood decaying and the coppice flourishing.

1787 "Through some neglect in sowing acorns, or in letting the deer and hogs in soon after they were sown, there is no appearance of its becoming a coppice." Many young oaks and beech, but many large bare places.

Today this inclosure still contains two quite separate areas of woodland with a north/south gap which has probably existed since the middle ages. The western part and the area north-west of the old coppice. contain oaks which are clearly A2-generation, pre-dating inclosure in 1775.

However, the former coppice appears to have been cleared and replanted in 1775, which is consistent with its prosperous condition in 1681.

The inclosure, thrown open in 1815 and not reinclosed since, is similar in structure to much of the uninclosed woodland.

Pitts (SU 19/14) 120 acres

The area of this inclosure is not listed in 1565 or 1660, but woods are listed at Cockley Hill and Ashley Hole.

1787 14 years after inclosure: "Full of thriving young oak which require thinning, and bare patches which require planting."

This inclosure, thrown out in 1815 and reinclosed in 1903, retains a small block of the original pure oak planting (SU 198145). A few much older pedunculate oaks remain on the site of the former Ashley Lodge, at the north-east corner of the inclosure (SU 201147). Soil structure and roots at Cockley Hill (Flower 1973) have shown that the last

remaining oaks were felled this century, so the Ashley Lodge oaks may therefore be the last relics of a former oak wood covering Ashley Lodge, parts of Ashley Hole and Cockley Hill, and possibly part of the area inclosed in 1775.

Ravensnest (SU 25/15) 82 acres

1565 Listed by Taverner as 16 acres of oak.

1787 Young oak interspersed with a few larger oak.

"The Keeper well remembers it being planted with seedlings, not acorns." (5th Report, Appendix 22.)

In this inclosure, which was thrown open in 1829, hardly any of the original 1775 sessile oak remains. It has almost all been cleared in the last ten years and replanted with oak and conifers.

Rhinefield Sandys (SU 26/04) 240 acres

1565 Sandhurst, listed by Taverner as 20 acres of old oak.

1615 Shandhurst, listed by Hurst as providing 34 oaks for felling.

1660 Sandis Wood decaying.

1787 Sandy Inclosure - fence broken down and few of the acorns planted have produced seedlings.

The 1775 planting was not successful and the inclosure was replanted with oak and sweet chestnut in 1809. Today part of the 1809 planting remains, the rest having been cleared and replanted with oak and conifers since the Second World War.

Sloden (SU 21/13) 279 acres

1565 Taverner lists Sloden as 30 acres set with ash, holm and thorn.

1787 "Upper part of the inclosure is covered with yew, holly, thorn, and in some spots a good sprinkling of oak and ash which require thinning."

Today Sloden is a confused area in which some of the oaks pre-dating inclosure still exist among the 1775 oak. The ash referred to earlier remains along the southern slope (SU 212122). The yew, of which there is a great deal within the former coppice area, is dying where it is now under closed oak canopy. Its absence from the 1565 survey, strongly suggests that it was planted, and Tubbs (1968, p. 167) has confirmed that the stand dates from 1775. Sloden and Ironswell Wood (SU 230147) are the only places in the Forest where yew forms a closed canopy.

Outside the old coppice and Sloden Wood area, the inclosure, thrown out in 1815, is a patchwork of 19th- and 20th-century oak and conifer plantations.

Wilverley (SU 24/01) 496 acres

215 acres of the inclosure formed medieval coppices (see previous sub-section).

1787 This recent inclosure contains fern only. The acorns with which it was planted were kept too long and none grew.

It was reinclosed in 1809 with oak, sweet chestnut and larch. Since 1890 there has been continuous clearing and replanting with conifers, in some part of this inclosure.

Discussion

The facts contained in the documents cited above, confirm Tubbs's suggestion (1968, p. 165) that most of the 18th-century inclosures were on already-wooded sites.

For three-quarters of the inclosure sites there is documentary reference before inclosure, and in all but four cases the area was at least partly wooded before inclosure.

As pointed out earlier, with the exception of the northern half of Stokeley, every one of the medieval coppices was well sited. While there is no consistency in the choice of soil (every one of the possible substrates occurs at several sites), they are all well drained.

The inclosures also show this choice of well-drained site in most cases.

It is clear that many of the most favourable sites in the Forest have been recognized and continuously managed for a very long time, in some cases for over 400 years. From the evidence, I think a distinction can be made between those parts of the Forest considered favourable for timber cultivation, which have been recorded in various surveys from 1565 onwards, and the unrecorded areas, many of which were wooded but not considered suitable for management.

The continual extraction of oak timber, discussed in section 3, has brought about a change from oak to beech in many of the formerly managed areas and some of the present-day uninclosed woods. There is good evidence of the change in the documents discussed in this section.

Ridley was oak in 1565 and 1609, mixed oak and beech in 1787, and is almost pure beech today.

Ironshill, oak in 1565, had all been felled for the Navy by 1787 and

only young beech was left in its place. This change is also recorded in Puckpits, Stubby Coppice and many of the uninclosed woods to be discussed in the next sub-section.

For a discussion of silvicultural management in the 19th and 20th centuries, I would refer the reader to Tubbs 1968, chapter 9.

UNINCLOSED WOODS

A-generations

Peterken and Tubbs (1965) discuss the regeneration phases in the uninclosed woods. Table 3, p. 162, which lists the ages of 60 trees, shows a widespread period of regeneration from 1650 to 1760. As suggested by Peterken (1964) this long regeneration phase can be subdivided into an initial A1-generation and a later post-1700 phase which, as it forms part of the upper closed canopy, I shall call A2.

Because of the very different management applied to oak and beech over the centuries, they are discussed separately. The present discussion of the origins of the A-generation is confined to oak; this is followed by a discussion of the management of beech.

My own measurements of 100 trees of girth greater than 4 metres, in 17 uninclosed woods, fall into 20 cm. girth classes, as shown in fig. 23. It will be seen that the number drops sharply above 5 metres; in fact I have so far found only 20 oaks in the Forest with girths exceeding 5.2 metres, whereas many woods contain a small number of A1-generation trees of 4 to 5 metres (e.g. Bramshaw, Brinken, Brook, Frame, High Corner, South Ocknell, Shave, Sunny Bushes). This generation can be dated approximately from fig. 20 as 1620-1680. The extreme scarcity of oaks older than 1620, coupled with the existence, throughout the

Fig. 23 Distribution of 100 oak girths >4·0m

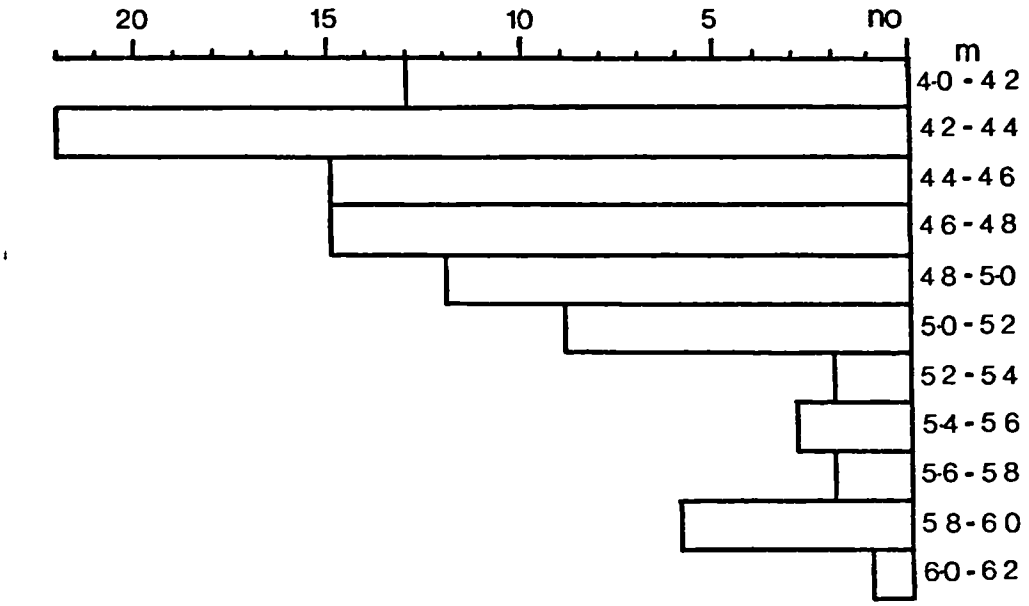
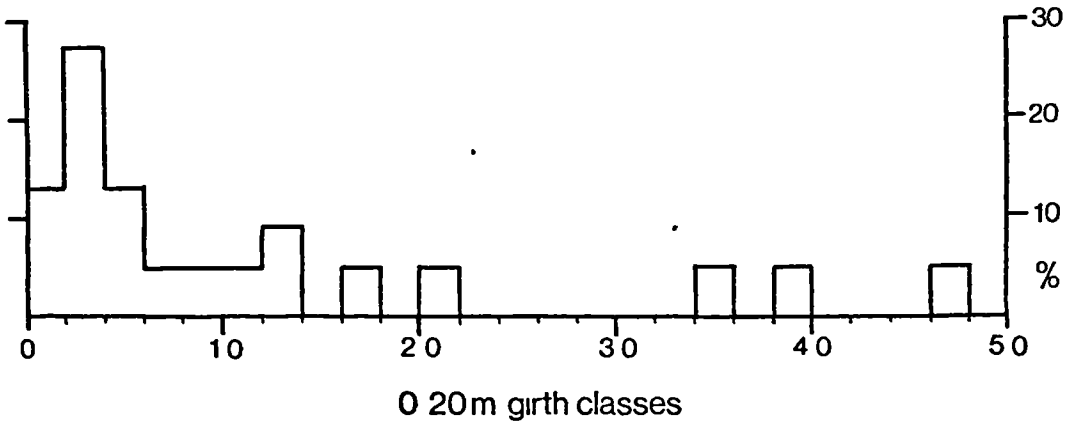


Fig.24 Percentage frequency of Oak girths

Data from 125m transect in South Ocknell Wood (su246108)



uninclosed woods, of the A1-generation, is consistent with the widespread felling and restocking during the Stuart period, evidence for which has been discussed in previous sections.

Support for the dating of this regeneration phase comes from another Royal Forest. Tubbs (1968, p. 155) records that eye witnesses, quoted in the 6th Report of the Commissioners of 1790, stated that the trees then standing in Alice Holt, mostly oak, dated from 1660-1670.

Oaks of the A1-generation are, almost without exception, of irregular, wide-branching habit, a result of development in the open conditions which must have existed at the time.

The information presented in Section 3, about equal-sized pairs and triads, strongly suggests that they are unnatural in origin. Support for this view is given by fig. 27, which records the spacing, between the basal centres, of 100 oak pairs from 17 woods.

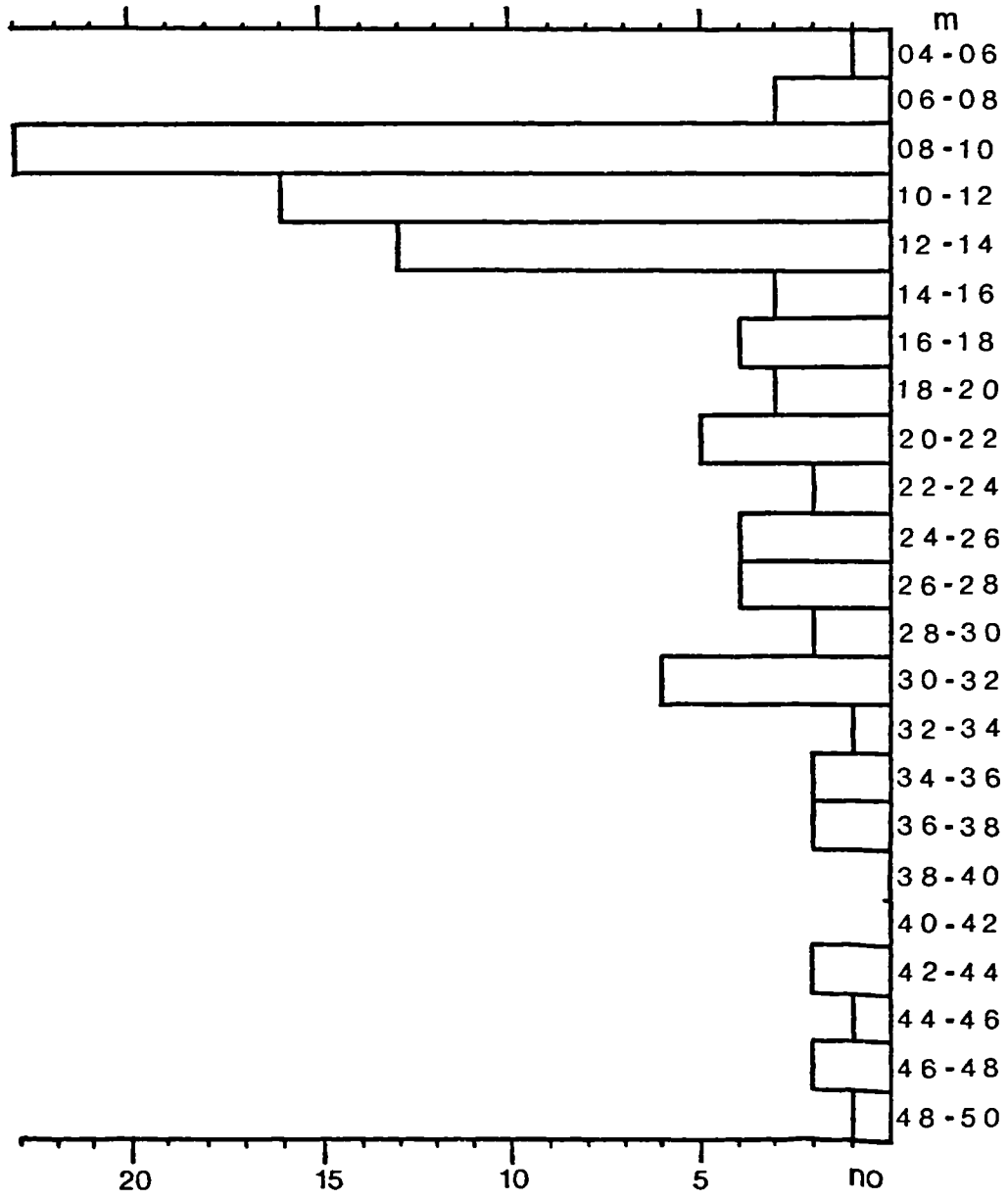
Pairs were measured in the following way: an arbitrary upper limit of 5m was set on the inter-stem distance. Every pair of even-aged oaks encountered, with a basal spacing below 5m, was measured. Even-agedness in this case was defined as any pair of which the girth of the larger tree exceeded the smaller by less than 10%. In the course of recording 100 pairs, eight equilateral triads were encountered. For the purpose of preparing fig. 27, the mean of the three pair distances of a triad has been counted as one pair.

Fig. 27 shows that the distribution of the 100 cases, by 0.2m classes, is strongly concentrated around the 1m point. The Poisson formula $f(x) = \frac{m^x e^{-m}}{x!}$ gives the following probabilities for the class values in fig. 27, assuming the probability of a single occurrence being equal for all classes:

Fig.25 Stubbs Wood (SU 371036) A2-generation *Quercus petraea* with very clear basal *Ilex* screen.

Fig.26 Sunny Bushes (SU 259142) Windfall *Quercus* stump with basal screen *Ilex* stump still in place. They both gave a ring count of 222 years. Girths: *Quercus* 3.00, *Ilex* 0.90 m.

Fig. 27 Distribution of 100 oak pairs with spacing <5·0m



0 - 0.013	5 - 0.167
1 - 0.056	6 - 0.121
2 - 0.122	13 - 0.00041
3 - 0.177	16 - 0.00001
4 - 0.193	23 - 0.0000000002

One further point concerns the triads: of the eight examples recorded, seven have a mean spacing falling into the two classes 0.8 - 1.2m.

I feel that this information justifies the assumption that equal sized pairs and triads are not the result of natural regeneration, and can therefore be taken as evidence of sowing in woods where they occur.

The largest sets found so far are 3.00 to 3.50 girth (e.g. Ashurst, Brook, Lady Cross Lodge, Stonard Woods), A2-generation trees sown between 1675 and 1725. Possible further evidence of sowing in the uninclosed woods in the 18th century comes from the occurrence of oaks with protective holly screens (see figs. 12, 25 and 26).

It must be stressed that the evidence for sowing in the uninclosed woods, while being an interesting aspect of management history, would seem to be of little significance in the origin of the A-generations. The numbers of trees involved is small in relation to the areas examined, the largest number of pairs in a single wood being 10, recorded in Crow's Nest (SU 243162) and Frame (SU 358034). Such plantings, sometimes with accompanying screens, must be seen as evidence merely of gap-filling or possibly replanting after the extraction of single stems; there is no evidence to suggest, as Lascelles did in 1915, that the uninclosed woods in general were the result of intensive management.

Peterken (1964, p. 127) says: "From the Reports of the Commissioners (1789-93), it appears that there was also an 18th century phase of regeneration in other Royal Forests, Dean, Alice Holt, Whichwood and Bere, which ended about 1760. The reports consistently attribute the cessation of this regeneration to a rapid deterioration in the administration of all the Royal Forests, after a period following the Restoration in which the exploitation of timber and the growth of underwood was closely controlled and in which the Winter Heyning and Fence Month were strictly enforced."

The implication of these reports is that the A2-generation developed naturally in conditions of low grazing pressure, and yet what little evidence there is suggests that the grazing pressure in the New Forest at the end of the 17th century was relatively high. Peterken and Tubbs (1965, fig. 3) point out that the figures for the period depend largely on a single census from 1670, which recorded a very high deer population (8,000 head against 2,000 in 1973), but a comparatively low pony population (1,000 against 3,000 in 1973). They also point out that ponies do far more damage to young trees than deer. Nevertheless, at a time when the pony population is the highest it has been this century, there is active regeneration in many of the uninclosed woods today (see figs. 29-53 in Part II).

It seems possible that the conditions suitable for regeneration of the A2-generation , remarked on by the Commissioners (1789-93), existed in the New Forest also. However, the full explanation of the origin of the A-generations must await more detailed information about the numbers of animals browsing during the 17th and early 18th centuries.

My own measurements confirm Peterken and Tubbs's findings of a widespread B-generation arising as a result of the 1851 Deer Removal Act. Many uninclosed woods contain this even aged generation with oak girths of 1.40 - 1.60 metres, 1850-1875 (e.g. Busketts, Frame, Gatewood Hill, Hollands, South Ocknell).

Fig. 24 contains figures from a 125-metre east-west transect carried out in South Ocknell Wood (SU 246108) in 1972. It clearly shows the three generations discussed above and the World War II C-generation noted by Peterken and Tubbs (see also figs. 29-53 in Part II).

The change from oak to beech

The most marked ecological effect of the heavy selective felling of oak in the 17th century was the colonization of the cleared areas by beech. The documentary evidence for this change in coppices and inclosures has already been discussed.

The evidence for the gradual change from oak to beech in many of the uninclosed woods is of three kinds:

1. The pollen record (figs. 2 and 3)

In both diagrams Fagus is present at a very low level throughout

the post-Atlantic period. There are two periods of sharp increase in the level of Fagus pollen (Church Moor 37 and 25 cm, Warwick Slade 35 and 22 cm). The second peak can be clearly dated to around 1800 by its coincidence with the reintroduction of Pinus sylvestris to the Forest in 1775. By extrapolation and comparison with the historical evidence, the earlier peak can be dated to around 1700.

From the pollen evidence so far available from the Forest, it seems certain that Pinus was absent from the area during historic times (see figs. 2 and 3, also Dimbleby and Gill 1955, and Tubbs and Dimbleby 1965). It was first planted experimentally at Ocknell Clump (SU 250118), and planting elsewhere followed shortly afterward, mainly as shelter belts round many of the inclosures made following the 1808 Act.

It can be seen from Taverner's survey of 1565 that many of the woods contained some beech. The intensive felling of oak recorded from the period 1620-1680, provided open conditions for colonization by beech and during the early stages of oak regrowth, the unaffected beech stock must have enjoyed a temporary period of dominance in many areas. The resulting colonization of such areas in the late 17th century is recorded in the first rise in the beech profiles around 1690.

The development of the closed canopy of the A2-generation in the early 18th century would have halted this rise in beech. However, from the historical record it is clear that similar conditions arose again in the late 18th century. First, widespread oak felling for the Navy, discussed below, provided more sites for beech expansion. In some woods, beech replaced oak altogether.

Second, planting of beech took place for the first time in the 1770s. Whereas the 1700 inclosures were all oak, several of the 1775 inclosures were planted with beech as well as oak (Coppice of Linwood, Furzey Lawn, Long Beech and Ocknell). This second phase of beech colonization, based on an already larger representation than the 1690 phase, is reflected in the second and more pronounced rise in the profiles around 1800.

Soil-pollen profiles, from six woods, carried out by Dimbleby and Gill (1955) gave similar results. Beech was present, but at a low level throughout the profiles, rising very rapidly in the top few inches. No precise date was put on this rise, but the authors consider the change has taken place within the last few centuries.

2. Oak felling for the Navy

As mentioned earlier, beech was little used in shipbuilding because of its vulnerability to rotting when wet. The documents provide plenty of evidence of the preferential felling of oak.

The Certificates of the Regarders 1570–1670 list very few beeches as having been taken. Thomas Hurst's list of trees marked for felling around 1615 also lists hardly any beech.

In the 1764 survey, the ratio of the total number of standing oak to beech and their relative tonnages is 2.8:1 in both cases. In the survey of 1783, the ratio of standing timber is 2.2:1, showing the increase in the number of beech in the areas surveyed. At the same time the tonnage ratio is 3.0:1, showing the continuing growth in volume of the oak timber then standing. However, evidence of preferential felling comes from the fact that, while the ratio of standing oak to beech in 1783 was 2.2:1, the ratio of oak to beech

actually cut for the Navy from 1783 to 1791 was 7.6:1.

Richardson, King and Driver, in their 1787 survey, describe several woods as having been cleared of oak for the Navy. Some of the woods listed are now planted with conifers, but four remain, in which the results of this felling can be seen today.

Hoe Beech (SU 324093)
Lodge Hill (now Ashurst Wood SU 333094)
Mallard Wood (SU 3160900)
Rushpole and Fair Crop (SU 306095)

All four woods are described as being oak/beech woods with some fine oaks remaining, but most having been felled for the Navy. In Rushpole and Fair Crop a few old oaks were left in 1787, but all the young trees were beech. Like the other three woods listed it is today an almost pure beech wood.

There are also several woods listed in the 1787 survey which have changed since, but with no specific reference to Navy felling. Examples are:

Bignell (SU 282134) covered with large oak, a few beech.
Brinken (SU 275058) oak.
Oakley (SU 218048) good oak.
Wickwood (SU 264095) more oak than any other wood in Boldrewood Walk.
Woodcrates (SU 270083) oak and beech.

Today these woods are all virtually pure beech woods.

3. Lichenology

The last two woods listed above are of particular importance as

examples of the persistence of rich lichen diversity in old beech woods in the Forest. Rose and James (1974) have pointed out that, while some of the highest species counts have been recorded in oak woods, the heaviest cover of foliose and fruiticose lichens, is found in old beech woods (the genera Parmelia and Usnea particularly). Busketts, Rushpole and Woodcrates are beech woods known to have contained a high proportion of oak in the past, but which today still retain exceptionally high lichen species numbers, 159, 126 and 146 respectively (Rose and James, Table 1).

The explanation for this persistence of the lichen flora on beech, lies, in my opinion, in the effect of selective oak felling in the past. While there has in many woods been a break in the structural continuity of oak, this has not been the case for beech. Field observation bears this out.

Because of the lack of oaks of girths greater than 5 metres, the decaying remains of oak which have collapsed from old age are not a common sight in the Forest, whereas the fallen remains of senile beeches are common, e.g. Busketts, Eyeworth, Knightwood, Rushpole, Stricknage, Woodcrates.

While a girth of 5 to 6 metres is not big for oak, which can exceed 10 metres, it is exceptional for beech. In studies on British Beechwoods (Brown 1953) 300 years is considered very old, and Appendices 1-5 record a girth range for 200-year-old beech of 2.75 - 3.00 metres. As the New Forest contains a large number of beeches from 4 metres up to a maximum of 7.40 metres, there can be little doubt that the beeches of the uninclosed woods, taken as a whole, exhibit a complete age profile, unlike oak.

Further evidence comes from the fact that, despite the greater

longevity and girth potential of oak, in many of the uninclosed woods the biggest trees are beech. Examples:

Anses (SU 224125) girths 4.90, 5.60 and at (SU 232127) 5.50.
Burley Old (SU 246043) girth 5.40.
Busketts (SU 316112) girth 4.10.
Denny (SU 335061) girth 4.80.
Eyeworth (SU 228151) girths 5.70 and 6.20.
Little Fox Hill (SU 299100) girth 4.20.
Mark Ash (SU 250069) girth 5.70, (SU 249073) girth 6.50.
Queen Bower (SU 289043) girth 7.40. This is the biggest tree of any species in the Forest.
Queen North (SU 230131) girth 5.90.
Rushpole (SU 312096) girth 6.60.
Wickwood (SU 266096) girth 5.80.
Wooson's Hill (SU 259079) girth 5.20.

Of the beeches listed above, those at Burley, Rushpole, Wickwood, Wooson's Hill, and the smaller at Mark Ash, have collapsed.

I think it is clear that, in the case of beech, there has been unbroken. continuity of habitat for the large range of lichens which will colonize both beech and oak, a continuity found in only some of the oak-dominated woods.

In some woods in which the A-generation oak has been removed and in which the oldest generation is beech, replanting of oak has taken place during the 18th or 19th centuries. It is characteristic of such woods that the lichen flora is very poor on the oak element which has suffered a complete break in continuity, e.g. Anses (SU 228125) 87 species, Mallard Wood (SU 317090) 80,

Ocknell Inclosure (SU 244117) 87, Matley Wood (SU 334078), although it contains oak of A1-generation, only has a count of 58, suggesting a break of continuity at some time in the past. Soil-pollen analysis by Dimbleby (1962) has shown that Matley has developed on a former heathland site. (Lichen figures from Rose and James 1974).

Primary Woods

The term "primary", in the strict sense of undisturbed post-Atlantic forest, cannot be applied to the New Forest, since evidence of interference exists in parts of every wood so far examined. I shall therefore use the term "primary" in the modified sense adopted previously by Pigott 1969 and Peterken 1974a, to denote woods which have never been clear-felled, but which have been managed to some degree, and which therefore represent much-modified relics of former natural woodland. Examples: Bramshaw (SU 262162), Brinken (SU 281053), Frame (SU 357035), Great Wood (SU 255154), Pinnick (SU 193077), Red Shoot (SU 185083), South Ocknell (SU 246108), Sunny Bushes (SU 260143).

These woods, which are ecologically the most diverse in the Forest, display many or all of the following characteristics:

1. Old woodland ground flora typified by Ruscus aculeatus, Euphorbia amygdaloides, Anemone nemorosa, Endymion nonscriptus, and Viola riviniana.

2. Characteristically stable soils. On non-clayey parent material, soils are Acid Brown Earths with no mobilization of iron and no signs of incipient podzolization.

3. Representatives of every generation of oak, the A1-generation being more often Quercus robur. Representatives of pre-A1-generation.

Active regeneration around the edges of the wood or in glades.

4. Persistence of extremely rich lichen flora, including significant indicator species absent in other woods.

1. Because of heavy grazing, the ground flora of the uninclosed woods is unusually sparse. Few of the indicator species listed by Peterken (1974b) are present. Anemone nemorosa is placed by Peterken in the group of plants not exclusively confined to primary woodland; their colonizing ability is very low and they are very rarely found in secondary woodland. Little information is at present available about Ruscus aculeatus. It appears to be almost exclusively confined to old woods where its preferred site is the niche between the roots of old oaks and very occasionally beech, where it receives an increased supply of moisture and nutrient. The only two places where I have recorded a discontinuous carpet over a large area are Brinken Wood (SU 281053) and Fletchers Thorns Inclosure (SU 272043), both lying on the alluvial bed of the Blackwater and both subject to periodic flooding. Ruscus appears to need relatively moist nutrient-rich conditions with generally good drainage. Its persistence in the damp litter of young coniferous plantations is consistent with the view that it is a plant which cannot withstand the conditions of high evapotranspiration left after clear-felling.

In areas which have been cleared and planted with oak, such as Backley Inclosure (SU 224074) and Islands Thorns Inclosure (SU 220155), Ruscus in association with Euphorbia is usually absent, but in areas replanted with conifers, small clumps often survive. This suggests that in young oak plantations, devoid of a shrub layer, the habitat remains open for too long, whereas under conifers, the rapid formation of a protective canopy and the accumulation of a moisture-retentive litter layer provide

conditions adequate for survival. It is not clear whether the association can remain indefinitely in these conditions or whether extinction is merely delayed.

There are several examples of the survival of this relic of former oak-dominated woodland. The site of Stubby Coppice was mentioned in the previous sub-section, page 75.

It survives in Salisbury Trench (SU 256142) which was inclosed and planted with oak in 1700, and cleared and replanted with Scots Pine in 1960.

In the north-east part of Holmhill Inclosure the few remaining clumps of Ruscus and Euphorbia have also survived two periods of disturbance. The area (SU 263085), lying north-east of Highland Water and its northern tributary, which was uninclosed oak/beech wood in 1787, was taken into Holmhill Inclosure when it was formed in 1815; in 1945 it was cleared and replanted with larch.

2. The work of Dimbleby (1962) and my own work has shown that clearance of forest cover from the siliceous parent materials of the New Forest, leads to rapid onset of podzolization and the development of the humus-iron-podzols found in heathland areas. In undisturbed woods the typical Acid Brown Earths, which occur in three of the five possible parent materials (Bagshot Sand, Bracklesham Beds and Plateau Gravel), display a remarkably even spread throughout the profile, not only of ferric oxide, but of dispersed humus. Analysis of these soils (Flower 1973) has confirmed Dimbleby's view that Acid Brown Earths are the original forest soils and their presence today is a likely indicator that the area has remained continuously under forest cover since the Atlantic.

Points 3 and 4 are interdependent, since the presence today of a rich lichen flora requires continuity of habitat from one generation to the next. The history of beech in the Forest strongly suggests that a rich lichen flora persists only in those oak woods where continuity was maintained through the critical period of 1620-1680. The paramount importance of this continuity is exemplified by Mallard and Pinnick Woods.

Mallard Wood (SU 316090), is mentioned by Richardson, King and Driver as having been cleared of much oak for the Navy in the mid 18th-century. Today older generations in the main part of the wood are pure beech up to almost 6 metres in girth, with a B-generation of oak poor in lichen cover and devoid of indicator species. Nevertheless, Mallard does contain an undisturbed wet boggy area running north-south either side of the Beaulieu River (SU 319091) which still retains a few old Quercus robur on which several significant species, including the large foliose lichens Lobaria pulmonaria and Peltigera horizontalis, are flourishing - species found only on beech elsewhere in the wood.

Pinnick is a particularly important wood, for not only does it contain the coppice relic mentioned earlier, but the central part (SU 193077) is among the finest primary woods in the Forest.

An Acid Brown Earth carries a continuous vernal cover of Endymion and Anemone with patches of Viola riviniana, Narcissus pseudonarcissus and Melittis melissophyllum. Euphorbia amygdaloides is present throughout and Ruscus aculeatus is abundant at tree bases and elsewhere. Above this is a continuous understorey of hawthorn with some holly. Beech is absent. Oak (Q. robur and petraea) of every generation is present. Regeneration is active at the western end of the wood. Most important is the presence of two Q. petraea pre-dating the 1620-1680

clearance phase (girths 5.30 and 5.40 m). The larger (SU 191074), a maiden tree, carries a rich lichen flora which includes over half a square metre of Lobaria laetevirens. The Lobaria species typify the Lobarion alliance, considered by Rose and James to be the climax lichen community in the New Forest. Because of the length of time necessary for its development, and its inability to colonize secondary woodland, it is an excellent indicator of habitat continuity. The effects of such interruption on the range of lichens present in various woods is shown in Rose 1974, table 4. Where primary woods in the New Forest and elsewhere may contain over 150 species per square kilometre, mature oak wood known to have been clear-felled in the past, and old coppice with standards, usually contain fewer than 70 species.

As there are today so few trees in the Forest predating the 1620-1680 felling period, evidence of the necessary continuity is missing. However, two points in the 1789 Report make it clear that a considerable number of old oaks survived. The 1707 survey, referred to earlier, says "... we find also in the forest a great number of old oaks, from the limbs of which may be picked very useful parts as knees, though the bodies may be decayed." The 5th Report, p. 40, considers the decrease of Navy timber recorded in 1783 to be partly due to the practice of cutting old oaks for fuel. Clearly several hundred oaks survived the Restoration felling period and were cut in the middle to late 18th century (c.f. Defoe's observations, p. 48). These trees provide the necessary continuity of habitat and may answer an anomaly mentioned by Rose and James, pp. 56 - 57. They point out that there seems to be no reason why certain lichen associations colonize widely dispersed trees while equally suitable intervening sites remain uncolonized. A possible explanation is that present-day concentrations are found around the former sites of pre-1620

oaks, which provided the spores for the colonization of the surrounding younger trees. The Quercus petraea in Pinnick Wood (SU 191074) and Quercus robur in Brinken Wood (SU 280052) are examples of pre-A1-generation trees, which are not only the oldest trees in the two woods, but carry the largest number of lichen species.

As there are so few pre-A1-generation oaks, it is worth considering how they managed to survive. For some, for instance Pinnick and Frame, there is no obvious explanation, but for others inaccessibility seems to be the reason. For instance the oak (Q. robur, 5.80m) in Lucas Castle (SU 249106) is in an isolated wood which is so small that it is not recorded on the 2½" O.S. map. The magnificent maiden oak (Q. petraea, 5.90m) in Bramble Hill (SU 259158) is in a narrow strip of wood between open fields on the east side and an alder carr on the west side. In cases like these, the recovery of isolated trees, which in the mid-18th century would have been of roughly 3-metre girth, would hardly have justified the effort required.

The truncated age structure of oak and planted sets in the A2- and later generations provide evidence of felling in primary woods, but because of their present-day floristic and structural diversity, it seems reasonable to assume that felling was carried out on a continuous-yield basis, even in the 17th century. Removing only the most suitable trees and replanting in the gaps left has not disrupted the continuity of habitat on which the exceptional lichen diversity of these woods depends.

The information about Navy felling contained in the Richardson, King and Driver survey does not cover all the woods in the Forest, so it is not possible to make any correlation between Navy felling and geographical location. Nevertheless it is noteworthy that three of the woods

containing the largest stands of pure A1-generation oak in the Forest, Bramshaw, Pinnick and Redshoot, lie in the part of the Forest most remote from Bucklers Hard, and from Lymington, the principal port from which New Forest timber was shipped to Plymouth, Portsmouth and Woolwich during the 18th century (11th Report, 1792, Appendix 13).

The cost of transport was often the highest single item in the price of timber and must strongly have influenced the choice of woods for exploitation.

In the 17th and 18th centuries, despite the great shortage of shipbuilding timber, 20 miles was considered a maximum overland haul. Beyond that distance, carriage costs added so heavily to the price that great oaks suitable for shipbuilding were cut up and used for joinery (Albion 1926). Although the ratio varied, the cost of transport often equalled the value of the standing timber.

Until 1695, carriage of His Majesty's Timber to Navy yards was a charge upon the county where it grew. During the reign of Charles I, the counties were reimbursed by the Exchequer at the rate of 5d. per load mile. Since, however, the cost was often four or five times that, the difference was in effect a hidden tax on the counties concerned.

The supply of timber for the Navy fell rapidly during the second half of the 19th century due to the change to metal construction. Although metal fittings had been used increasingly since the middle of the 18th century, it was the use of iron for hull cladding in the 1860s which finally resolved the unending timber problem.

Possibly the remote A1-generation stands of oak mentioned above were the last uncut areas from the Restoration planting, and were saved by the rapid fall in demand of the 1840s and 50s.

The Parliamentary Reports of 1787-1793 recorded the dearth of mature oak throughout England's forests, brought about by the ship construction of the mid-18th century. However, the widespread plantings carried out in 1808 as a direct result of the Reports, were in vain: long before such timber was fit for use, the days of wooden construction were over.

5. CONCLUSION

The history of the uninclosed woods of the New Forest from 1600-1800, as shown by historical and field evidence, is consistent with that recorded for other forests in Southern England (see Albion 1926). The two periods of intensive felling, first under the Stuarts and Commonwealth, and second during the Seven Years War and early Napoleonic wars, were followed respectively by widespread regeneration, and by planting. The result, where oak is concerned, is the truncated and stratified age structure found in so many of the woods today.

Each of the primary blocks of the uninclosed woods has a unique character, a reflection of its particular management history. Yet in all of them, despite varying degrees of modification, there are ecological signs of their unbroken descent from the ancestral Forest of prehistory.

Appendix 1

All references are preceded by the call mark of the document. Call marks of documents in the Public Record Office are initialled P.R.O. A few of the documents are in the Hampshire Record Office at Winchester; these are initialled H.R.O. My comments appear in brackets throughout. Where an entry has been cited in a previous work on the New Forest, the reference is given.

P.R.O. E/32/159 (mem. 6), 41 Henry III, 1257

Lists names of offenders and the woods in which spoiling of young and/or old wood has taken place. Among the places listed are Depeden (Dibden), Merchwude (Marchwood), Dune (Denny) and Langeford (Langford Farm). (All are in Eling, sometimes listed as part of the Forest).

P.R.O. E/32/161 (mem. 6) 8 Edward I, 1280

The earliest Regard so called. (At this time the Regard lists the land holders' names with acreages, but no exact location.)

(dors mem.1) This is the frequently quoted first perambulation of Edward I. For a full transcription see Wise, p. 40f.

P.R.O. E/101/142(6) 13 Edward I, June 1285

Short document, in old French, from the Bailiff of the New Forest to Queen Eleanor about woods called Lymington Woods belonging to the King, lying within the New Forest.

(This and the 1257 document suggest that at the time, woodland still covered parts of the Forest which have long since become mainly agricultural.)

P.R.O. E/101/536 (29) 26 Edward I, March 1298

Account of land holdings by John Randolf, Keeper of the New Forest. (As mentioned above, this is the earliest document examined which divides the Forest into bailiwicks.)

P.R.O. E/101/142 (21) 12 Richard II, 11 May 1389

Item 1. Appointment of Oliver Punchardon, John Emmory, John Fismark and William Hemberford to sell sufficient wood, timber and underwood, for the repair of the Lodges of Harebergh, Lyndhurst, New Lodge and Brockenhurst.

Item 2. £130.7.0 received from the sale of 109 acres of timber and underwood in various coppices. (See also Cal. Pat. Rich. II, 1388-92 pp. 14 and 40: Appointment of William Frebody to survey and control expenses of the four named above in enclosing coppices for the repairs.)

(This is the earliest reference to the practice of encoppicement.)

P.R.O. E/101/142 (7) 13 Henry VI, 9 July 1435

Commission to Henry Carter of Welhampton and Thomas Coke of Menestede to cut and sell 100 acres of wood and underwood at "Cranmore" in Suthampton Bailly to pay for repairs to the King's three Lodges.

Published in Cal. Pat. 1429-36, p. 475, 9 July. This is referred to in VCH: Vol. II, p. 443, as being the earliest definite record from the Forest. The site is not given. (Cranesmore today is devoid of woodland.)

P.R.O. E/101/142 (10) 17 Henry VI, 19 November 1438

Commission to Carter and Coke concerning the sale of 100 acres of the coppices of Rampnore for the repair of New Lodge and Quenebourne and Harborowe Lodges. A further 50 acres more than that specified is available for sale, and the King's agent, Richard Clyfdon, directs that this extra 50 acres be sold.

Published in Cal. Pat. 1436-41, p. 269, 19 November.
(This is the only mention of the coppices at Ramnor.)

27 Henry VIII, 1535

VCH vol. II, p. 443: "A note concerning Godshill Coppice, a plantation now of oak, in the Exchequer of money paid to divers persons for the making of 10 furlongs 24 perches round the said coppice for the safe keeping of the spring or stools thereof."

P.R.O. LRRO/5/39 7 Elizabeth, 1565

"The book of survey" by Roger Taverner, surveyor to Elizabeth I. This earliest survey of New Forest woods lists, by bailiwick, 150 wooded areas by name, and gives acreages. Ten of the woods are listed as coppices: Old (South) Bemley, Young (North) Bemley, Hocknoll, Wotton, Lynwood, Brodstone, Northwood, Stubbye, and two at Ironshill.

(This survey is discussed in VCH vol. II, p. 446, and in Tubbs 1964).

(The full text of this document is included as appendix 4.)

P.R.O. E/159/353 (Rot. 254) Mich. 8 Elizabeth, 1566

Certificate of intrusions, which lists the following coppices as having been affected: Ironshill, Goddeshill, Wotton and Gatewood.

(It is clear from this that Taverner's Survey did not specify all coppices. Goddeshill and Gatewood are both listed, but are not called coppices.)

P.R.O. E/178/2007 9, 10, and 15 Elizabeth, 1567, 68 and 73.

These documents, referred to in Tubbs 1964, are the Articles of Instructions fr the Regarders in the New Forest. The order and form of the instructions is the same each year, and they are, in brief:

1. Each Regarder shall have, and keep safe, a sealing axe bearing a peculiar mark.

2. No dead, rotten or wind-fall trees shall be taken unless first viewed by the Regarder and marked with his sealing axe.

3. No oak, ash, beech or other tree of size appointed by the Regarders shall be felled or sold without first being marked with the sealing axe and recorded.

4. No underwood or thorns may be cut by Forester, Ranger or Keeper for the purpose of making lawns or widening rides, without informing the Regarder. Value of any such cutting to go to Her Majesty.

5. Deerbrowse to be cut only in the harshest weather, and then never from oak if other browse is available. Boughs cut shall never be bigger than a buck can turn over with his head.

6. No deerbrowse, lops of trees, firewood or feewood to be taken away before the Easter following its felling.

7. Keepers shall not allow any horses, cattle, sheep or swine to enter a coppice until the spring is eight years old, neither shall deer be allowed to damage the spring. Officers have the right to impound animals found in the coppices.

8. Any officer finding a person gathering sets in any of the Queen's woods, may take said sets for his own use. If it is not the gatherer's first offence he shall be put in the stock for 24 hours.

P.R.O. E/101/142 (12-20)
E/101/147 (7-17)
E/101/536 (30-32, 34-35) 12-44 Elizabeth, 1570-1602

Certificates of the Regarders. These certificates, recording the nine bailiwicks, usually on one membrane, sometimes more, were submitted annually to the Exchequer. Certificates exist from 22 years in the reign of Elizabeth I. Answers are given to questions close in form to the instructions issued annually to the Regarders (see preceding entry). Very briefly, the questions are:

1. Do the Regarders have a marking axe?

2. Has all dead, decaying and windfall timber been viewed and marked?

3. What timber trees have been cut?

4. Have any lawns or ridings been made?

5. Has any deerbrowse been cut?

6. What windfall and moorfall timber has been taken?

7. Are there any coppices in the bailiwick, and what is their condition?

8. What allowance has been made for officers' fees, and have records been kept?

(These certificates, which continued through the Stuart period, ending with the certificate for 1673, contain a great deal of information. Quantitative timber details are given in tabular form by bailiwick as appendix 2. The totals of timber year by year are given in graphic form in section 3, figs. 16, 17 and 18. Listed below are answers of interest to question 7, concerning coppices.)

13 Elizabeth, 1571

South Bail: Stockeley Coppice is dead the last hard winter.

15 Elizabeth, 1573

West Bail: Sloden containing 47 acres and 12 acres of void ground within the coppice was sold by John Stockman the Queen's Woodward for £63.9.4, part of which paid for hedging and ditching.
South Bail: Ironshill Coppice well preserved but Stokely Coppice spoiled by Richard Okeden allowing deer and cattle in.

16 Elizabeth, 1574

West Bail: Sloden corrupted by deer and horses put in.
East Bail: There is a coppice new made this year near to Ashers, made without our assent. Part filled and carried away.
Fritham Bail: Hocknolde coppice hedged and ditched this year and some part sold.

18 Elizabeth, 1576

Godshill Bail: No hurte done in Ruye Coppice.
East Bail: Payment made by John Stakeman for

repairs to hedge round Ayshers Coppice. 4 Loads of Alder cut for scaffolding for Lodge repairs.

21 Elizabeth, 1579

South Bail: Coppices in this Ball are of such age that hedges are pulled up.

25 Elizabeth, 1583

Godshill Bail: Sold by John Stockman, woodward, one bushey copes called Brodestone Coppice for £25.5.6.
South Bail: Wood within Ironshill Coppice sold for Her Majesty's use for £21.17.4. Payment for hedging, ditching, and enclosure £15.4.0.

26 Elizabeth, 1584

Battramsley Bail: Wotton Coppice lopped and shrouded by John Stockman.

28 Elizabeth, 1586

South Bail: Payment made for mending Gatewood Coppice hedge.
Fritham Bail: Wood from Bymley Coppice sold for £27.17.2. Fencing, hedging and ditching £9.4.11. Also cut by warrant for repairs 18 trees.

33 Elizabeth, 1591

Burley Bail: Sold by woodward one copee called Ridley Copce containing 30 acres, allowed for hedging and void ground 6 acres, so remaining 24 acres sold for £15.13.0. £9.14.10. paid for hedging and ditching 334 longge. (A unit of land-measure ranging from 15 to 20 feet. Worlidge 1669: "A perch or lug is sixteen foot and a half land-measure, but is usually eighteen foot to measure coppice woods withal." (Zupko 1968).)

35 Elizabeth, 1593

Burley Bail: Robert Marsh hath opened hedge of Ridley coppice and put in more than 100 hogges, causing £5 damage. (Since hogs were put in only two years after cutting, it was underwood that was cut and timber trees were left standing. Confirming this is the absence of timber sale in Burley Bail that year, and the price, which is much too low for timber, selling then at around 12 shillings per ton.)

36 Elizabeth, 1594

Godshill Bail: Northwood Coppice sold containing in the lower furlong 15 acres, in the second furlong 25 acres and the plot 9 acres, total value £57.13.8. Felled in said coppice 240 oke valued at £48.0.0. For hedging and ditching and gate £8.0.0.

37 Elizabeth, 1595

Godshill Bail: Ellis Smythe hath digged oken roote in a coppice of a years growth called Northewood Coppice (see Tubbs 1964, p. 99).

39 Elizabeth, 1597

South Bail: Woodward without warrant did lop 320 oaks in Northley (Norley).
Fritham Bail: 58 cole fires found in Hocknoll Copps. By what warrant coppice was felled and sold we know not.
Godshill Bail: Sold by woodward in Sett thornes 59 acres of holme, thorn and hazell wood total £44.3.4. Part of this ground remains to be felled. (But see 41-46 Elizabeth for the inaccuracy of this report.)

P.R.O. E/159/368 (Rot.182) Hil. 17 Elizabeth, 1575

Report of the illegal taking of 200 oak and ash timber trees worth £20.0.0. from Bradley Coppice.

P.R.O. E/159/387 (Rot. 158) Trin. 26 Elizabeth, 1584

Long memorandum concerning the New Forest, covering the following points among others:

Lord Warden to be entitled to fifty loads a year of lops for firewood.

Keepers, as well as their annual wage of 26s. 8d. a year, have rights to windfalls and rotefalls, but may not cut browsewood. From now on they may only have boughs and windfall trees where no part of the root is torn up. Since Rangers can no longer live on 26s. 8d. plus boughs, it is ordered that they shall have £4 per annum paid out of wood sales from windfalls. No further timber to be allowed to be cut for house building.

(Windfalls which do not tear up roots are presumably breaknecks and would probably be at least partially decayed. This memorandum is an important step in the change to more intensive management of timber. From now on, all green timber is sold on behalf of the Crown. Officers' perquisites can only be taken from breaknecks and fallen boughs and no boughs may be cut for deerbrowse. The long-term and beneficial effect of this measure can be seen in Peter Pett's report on Navy timber in the New Forest and Forests of Bere, Shotover and Stowwood. See 17 May 1632 below.)

P.R.O. E/123/22 (f. 128) Hil. 37 Elizabeth, 1595

English bill brought by John Taverner against Ambrose Snelgar for wrongful felling of 260 oaks, part timber and part firewood, in Godshill Coppice.

P.R.O. C/66/1431 37 Elizabeth, 21 July 1595

Grant to Augustin Hill, of rights to wood and underwood in Woodball alias Catshill Coppice, of 50 acres, Brodestone Coppice of 40 acres, both in Godshill Bailiwick, Young Bemley and South Bemley Coppices of 30 acres each lying near to Hocknoll Coppice in Fritham Bailiwick. Such rights to revert after a period of 21 years. (See Tubbs 1964, p. 96.)

P.R.O. E/178/2047 (mem. 6) 18 June 38 Elizabeth, 1596

280 trees lopped in Pold Oaks in Westlynwood Bailiwick. (Almost certainly oak; see similar reference in E/178/3097 (1608) below.)

Sold also two aldermoors called Faire Croppe and Deadman's Moore totalling 16 acres.

P.R.O. E/178/2051 40 Elizabeth, 1598

In Godshill Bailiwick 600 timber trees have been felled and rooted in Catle and Brodstone Coppices. (It is clear from this that Castle Hill now in Godshill Wood is the location of this coppice known variously as Catshill, Cattlehill and Woodball.)

P.R.O. E/178/2051 41 Elizabeth, 12 September 1599

About two years past, a covert called Setthornes containing ninety acres was encoppiced by William Christmas, Woodward. (Tubbs 1964 cites similar reference to this encoppicement recorded on membrane 10 of the document above. It says further that greater part of Setthornes when felled before encoppicement consisted of holms and old thorns.)

P.R.O. LR/2/266 (pp. 251-257) 41-45 Elizabeth, 1598-1603

(This document is undated, but contains references to incidents from 1587 to 1597. It is merely addressed to the Crown, but would seem to be the presentation of evidence, before the Eyre Court, of offences in the Forest. It is a long document, worth recording in brief, as it gives the details of a highly lucrative 'Ring', engaged in the illegal felling of timber during a period of ten years.)

Arthur Swayne (made Keeper and Woodward in 1587), with John Vynes, Ranger, and Keeper of Battramsley Bailiwick, cut down 100 oak and beech. In 1594 Swayne together with Roger Earthe cut 100 timber trees worth £200 and, saying it was underwood, paid the Crown £20. Swayne cut 72 and 100 timber trees worth 40s. a tree, but paid the Crown 3s. 4d. a a tree for the former, and 2s. 6d. for the latter, these being sold to Richard Taverner. The same year Swayne sold his office of Woodward to Henry Audly for £300. (This is a measure of the money to be made by a corrupt official.)

In 1595, Audly, with William Christmas and William Oseland, lopped and topped 280 oaks in Westlynwood, many of which later died from being girded beneath the boughs. A month later they lopped 140 oaks in Norley, and the following March 140 oaks in Setley. In both cases many died and the rest suffered from decay.

In 1595 and 1596 these three felled illegally 700 trees containing more than 2,000 tons of timber, saying they were for fortifications on the Isle of Wight.

Swayne, Audly, Christmas, Oseland, Earthe and Vynes, when they learned that the authorities knew of their deeds, conspired to cover them up, by obtaining from the Court of Exchequer a commission to enquire into fellings in the Forest. These enquiries into the location, price and legality of

all fellings were to be made either from witnesses, or the sworn statement of twelve lawful men. The twelve jurors, empanelled by the six offenders for the hearing at Romsey, were all known confederates of the offenders, and had themselves been tried for abuses in the past. These jurors then swore that the illegal fellings had been made in accordance with various fictitious warrants.

Finally, Audly, Christmas and Oseland conspired with John Taverner, Surveyor of Her Majesty's woods south of the Trent, and Augustin Hill (lessee of the Godshill Coppices) to consider how they might, for their own profit, fell the 200 acres of timber called Setthornes, then 200 years old. "By common report the same covert at first was set by mens hands for the preservation of the Royal beasts"; there were also many saplings of oak and ash. Tavemer reported to the Lord Treasurer that Setthornes, a coppice containg 100 acres of underwood of thorn and holly, was fit to be sold. The Treasurer therefore directed Christmas to cut the same, saying that no timber should be taken, and that it should be fenced properly afterwards. They cut down everything and destroyed all the saplings; the covert would never be the same again. For all this, Christmas and his conspirators paid the Crown £49.10.0. and made £500 for themselves.

P.R.O. E/101/143 (1) 1, 2 and 4 James I, 1603-1606

Certificates of the Regarders. These three certificates contain information included in the graphs and appendix 2, but no specific remarks about coppices.

P.R.O. LR/2/194 (f. 451) 5 James I, 29 May 1607

Application to Sir Julius Caesar from Christopher Horde for a Royal patent for a fee of £100 for rights of pannage and herbage in Wooton Coppice, and rights to enough timber to build a house in the coppice "in consideration whereof, I will raise within the said coppice, ten thousand oakes more than there are now."

P.R.O. E/178/3097 (mems. 17 and 18) 6 James I, 6 April 1608

Inquisition concerning abuses in the Forest, among which are:

In 1603 John Lovell lopped 280 oaks in Poldoaks.

Christmas and his deputy sold 30 ashes totalling 60 tons of timber from Studley Head. William Osland took three-quarters of a year to cut down a stand of beech at Holmhill yielding 22 tons of timber.

William Christmas felled 200 sapling and 30 to 40 great trees within and without the ditch round King's Coppice near Gatewood.

(See Tubbs 1964, p. 100, for introductory remarks from this inquisition.)

P.R.O. LR/2/194 (f. 121) 6 James I, 1608

Coppice rent return for the counties of Southampton, Wiltshire, Gloucestershire, Somerset, Devon and Cornwall. Listed as ancient Crown Possessions in Southampton are the coppices of Cattlehill, Bradstone, Young and South Bemeley, all leased to Augustin Hill.
(Confirmation of lease of 21 July 1594).

P.R.O. LR/2/203 (f. 1-15) 7 James I, 1609

John Norden's "Coppices in New Forest, County Southampton", published by Heywood Sumner in 1931 as "J. Norden's survey of Medieval Coppices in the New Forest", in "Local Papers, archaeological and Topographical, Hampshire, Dorset and Wiltshire", London: Chiswick Press, pp. 152-177.

(p. 154 line 1: "Some few copices in the New Foreste are not viewed but according to your honourable pleasures, they shalbe done." Footnote by Sumner to Norden's statement: "Search in the Record Office failed to find trace of such suggested additional survey of "some few copices in the New Forest."

The hitherto missing survey is presented immediately below.

Sumner in his transcription of the original document for publication made a number of mistakes, the three most serious of which must be mentioned. (i) p. 160 refers to Norwoode Cops, which Sumner says is Norley Wood, the southernmost coppice on his map on p. 153. Norwoode is not Norley, but Northwood in Godshill, to which there are references in other documents listed above.

(ii) p. 166 lists Ironshill Coppice which he takes to be Ironshill north-east of Lyndhurst. It lay due east of Brockenhurst in which is now New Copse Inclosure. The positions of these coppices are discussed in detail in section 4.
(iii) p. 169. Sumner, in redrawing the map of Wotton and Bradley, has reversed the whole map left to right. In Norden's MS the positions of the two coppices have been transposed, but by reversing the entire map the outlines no longer fit the forms still clearly distinguishable on the current 2½" Ordnance Survey.)

P.R.O. LR/2/194 (f. 282 and verso) 7 James I, 18 April 1609

John Norden's supplementary coppice list, hereafter referred to as his coppice list, as distinct from the survey listed above. The notes accompanying this list refer to the two articles immediately below. (Fig. 6 is a copy of the complete document with a transcript. It will be seen that to the 14 coppices listed in the survey can now be added Set thornes, Castle Downe (Castle Hill), Godshill and Hocknall from the coppice list.

The places fit for Coppices, the right hand column, will be dealt with in section 4.)

P.R.O. LR/2/194 (ff. 173-174 and 306 and verso) 7 James I, 1609

Two communications by John Norden, originally submitted with the survey above, in which he discusses management methods. These documents have much in common; I have therefore given a combined précis in section 3, dealing with past management methods.

P.R.O. LR/2/194 (f. 268) 7 James I, 1609

A communication by John Norden, concerning abuses in the Forest, in which he says that yearly spoils and wastes, with breaknecks, moorfalls and decayed trees total 800 loads, and that the Keepers sell 300 loads a year.

P.R.O. LR/2/194 (f. 483) 9 James I, 5 November 1611

An order concerning provision of timber for the

Navy. It is required that 6,000 loads of timber be supplied from the New Forest and the Forests of Shotover, Stowood and Barnewood. There shall be 2,000 trees containing at least 2,000 loads, 1,500 loads of crooked timber, and the rest, straight timber, to be taken from His Majesty's land in Suffolk, Norfolk, Essex, Oxford and Berkshire.

(f.487)

Timber survey written in the same hand, accounting for the 6,000 loads as follows:

Norfolk and Suffolk	500
Deane	2,000
Shotover & Stowood	500
Swincombe & Ewelme (Oxon.)	500
New Forest	1,000
Several manors in Kent	200
Altons Wood (Worcs.)	400
Barnewood (Bucks.)	300
Several manors in Herts.	40
Sherwood and the North County	800
total	6,240

P.R.O. E/178/3097 (mem. 36) James I, undated

List, written by Thomas Hurst, of oaks marked for felling in three bailiwicks. Although undated, it would appear from the other documents in the bundle to be 10-15 James I. There is no reference to the previous order for 1,000 loads from the New Forest; however it should be noted that this list totals 1,042 trees. (This list is of interest in showing where large stands of oak were growing at the time, and it is included in full as appendix 3, and discussed in section 4.)

P.R.O. E/101/536 (36) 22 James I, 1624

Moorfalls sold, listed by bailiwick (figures in appendix 2.)

P.R.O. E/101/536 (33) 8 Charles I, 1632

Certificate of the Regarders.

Lops of pollarded trees sold in Stubby Coppice and Pold Oakes (figures in appendix 2.)

P.R.O. SP/16/204 (f. 32) 8 Charles I, 12 December 1632

To the officers of the Navy. There is a warrant for 6,000 timber trees to be felled for ship building; 2,000 each from the Forests of Shotover and Stowood, East and West Bere and the New Forest.

P.R.O. SP/16/215 (f. 39) 8 Charles I, 13 April 1632

Peter Pett, one of His Majesty's Shipwrights, has according to a warrant, marked 2,000 trees in the New Forest, these 2,000 making 3,000 loads. He finds only 400 trees fit for felling in East and West Bere, fit only for tree-nails and short planks. This is 1,600 short of the warrant for that forest, but these can be made up from the New Forest or from Alice Holt, in which the timber is generally good.

(Note that there is more suitable timber in the New Forest than is called for by the warrant.)

P.R.O. SP/16/215 (f. 90) 8 Charles I, 27 April 1632

This is a list of timber marked for felling in the New Forest by Peter Pett, who was Master Shipwright at Deptford, and the Chief Naval Architect of the time. Numbers of trees are listed for each of the following eleven uses:

Plank logs, beam pieces, wall pieces, compass timber, top timber, tree-nail trees, trees for knees, knees on lops, grubbed trees, floor timber, grubbed knees. The totals by bailiwick are:

	trees	loads
North:	1,537	2,732
South:	70	128
Fritham:	212	429
Burley:	81	186
Inn:	57	135
Battramsley:	60	156
East:	48	118
Total	2,065	3,884

P.R.O. SP/16/216 (f. 56) 8 Charles I, 17 May 1632

Report signed by Peter Pett:

"In accordance with the warrant .... I have marked 2,000 good and serviceable trees in the New Forest and note the good service done by the Regarders and Keepers there sparing the tops of the trees which yield many good knees.

"In East and West Bere I can find only 400 serviceable trees, but here too they have been well cared for.

"Abuses in Shotover and Stowood are unspeakable. Many good trees are spoiled by cutting the tops for browse for the deer."

P.R.O. SP/16/229 (f. 114) 8 Charles I,(1632

Remembrance concerning the preservation of timber fit for building H.M. Ships.

"It is found by daylie experience that most timber trees in His Majesty's forests are decayed, most serviceable trees having been culled out. New Forest is so far decayed that a report by H.M. Master Shipwrights, employed making a choice of 2,000 trees there, says that upon search of the whole forest, that the like quantity can hardley be made choice of for a second supply in that place, for though they have seen many in number yet they are so decayed dotards and windshaken that they are not fit to be used on H.M. Ships."

(A Remembrance is a general submission compiled from various documents by an official, in this case probably in the department of Exchequer. His statement about the amount of timber available from the New Forest is clearly at odds with Peter Pett's reports.

This Remembrance has been quoted, without reference to Pett's reports, by M. Oppenheim in 1894, "The Royal Navy under Chas. I",English Historical Review, vol. IX, p. 481. Oppenheim is in turn referred to in the publications of the Navy Records Society, see, N.R.S. 1896b.)

H.R.O. 5M53 15 Charles I, 1639 Calender of Wriothesley Deeds

License for theEarl of Southampton to cut the underwood, fell 252 decaying trees out of the 490 trees growing therein, and to enclose his several coppices called Culverly and New Coppice in Ipley, totalling about 50 acres.

P.R.O. E/32/177 (mem. 4) 12 Charles II, 1660

Presentments of the Regarders.

(This document, listing 57 woods, including 10 coppices, is transcribed in full on following page.)

P.R.O. LR/2/266 (f. 262) 14 Charles II, 1662

Certificate of the Regarders (figures in appendix 2.)

P.R.O. E/101/143 (2) 22-25 Charles II, 1670-1673

Certificates of the Regarders (figures given in appendix 2).

Certificates for 1670 and 1671 both mention that the inclosure of 300 acres has been carried out and that Holm Hill Coppice has been fenced in 1671. (The former reference must be to the Treasury Warrant of 1669 for the inclosure of 100 each at Priors Acre in North Bailiwick, Dunstone Heath in Inn Bailiwick and Holm Hill in Fritham Bailiwick, 300 acres in all; see "Extracts from the Swainmote Court Book", 1854.)

P.R.O. MPB/45(1), 1700

Maps of seven inclosures by William Stede:

Aston Hill and Woodfidley
Pucpits
Long Beech Hill
Burley Sandys
Salisbury Trench
Reaw
Danes Hill and Priors Acre
(Discussed in section 4.)

P.R.O. E/32/177 (mem. 4)
Presentments of the Regarders of the New Forest
12 Charles II, 1660

We present that his Majestie hath demeasne woods within the said forest namely:

In South Ball:	Hollands Wood decaying, Ironhill Wood decaying, New Coppice very prosperous, Stubby Coppice, Stockley Wood prosperous, Litten Wood prosperous, Norley Wood very prosperous, Barmoore Wood, Little Salisbury & Pignell decaying.
In East Ball:	Dunny Wood decaying, Woodfidley prosperous, New Coppice & Ashers Wood very prosperous & Kings Coppice likewise prosperous.
In Le North Ball:	East Linwood & Holmehill the greatest part decaying, Malwood decaying partly & Rockerom & Little Eye Woods very prosperous.
In the Inn Ball:	Old Lodge Wood & Costicles very prosperous, Gretnams Wood & Aunsleys Banke very prosperous.
In ffritham Ball:	Iweare Wood & Studley Wood very prosperous, Anstees Wood & Membley Coppices very prosperous. Bolder Wood & Brackley Wood very prosperous, Hocknell Coppice prosperous & Hocknell Wood decaying.
In Godshill Ball:	Godshill Wood very prosperous, Ellens Thornes Wood very prosperous & Crockhills Wood likewise prosperous.
In Linwood Ball:	Linwood Wood decaying, Poleaks Wood, Rew Wood & South Wood prosperous.
In Battramsley Ball:	Wootton Coppice, Bradley Coppice & Chamberlyns Corner very good younge timber & prosperous, Mountane Wood, Oaken Banke or Brow likewise younge timber prosperous, Rinefeild Wood, Sandis Wood, Hurst Hill Wood & Watracksley Wood decaying.
In Burtley Ball:	Ridley Coppice very prosperous with younge timber, Anderwood, Sheerwoods, Oakley, prosperous, Cardinalls Hatt, Cockroad Wood prosperous, Shabden, Highcroft, & another wood called the Trees good younge & prosperous.

H.R.O. 2M30/669, 1783

Survey of timber in the New Forest conducted by Thomas Nicholls and Henry Tombes, by Order of the House of Commons. A copy of the whole of this three-page document is included (fig. 19).

(This survey provided the original figures for the 1789 Parliamentary Report. The figures in the survey vary greatly from the figures published in the 5th Report. This survey is discussed at length in section 3.)

P.R.O. F/20/48, 1787

Bound volume containing the original manuscripts of the three surveys of the Forest prepared for the Parliamentary Report.

Thomas Richardson surveyed the walks of Ironshill, Whitley Ridge, Lady Cross, Ashurst and Denny.

A. & W. Driver surveyed the walks of Ashley, Castle Malwood, Bramble Hill, Eyeworth and Broomy.

William King surveyed the walks of Rhinefield, Burley, Wilverley, Holmesley and Boldrewood.

(These very detailed surveys list every wood in the Forest, with a note of what wood and underwood is growing. General comments of interest are appended by each author. These surveys are discussed in section 4.)

P.R.O. F/17/225, 237 and 269, 1787

Three original coloured maps prepared by the Surveyors to accompany the surveys listed above. F/17/225 by King, 237 by the Drivers, and 269 by Richardson. They vary in size, scale and quality, but all show all the woods mentioned in the corresponding survey. These maps served as the basis for the familiar 1789 map, engraved by W. Faden, at a scale of four inches to the mile, which accompanied the 1789 Report submitted to Parliament.

H.R.O. 2M30/669, 1791

Correspondence between John Fordyce, one of the

Commissioners of the Land Revenue, and Thomas Nicholls, Purveyor of Portsmouth Dock, concerning the latter's survey of 1783.

This appendix lists information contained in the Certificates of the Regarders from 1571 to 1673, by Bailiwick. The information is grouped under five headings:

Mrf: Moorfall, Windfall and Breakneck timber

Dod: Doddard and decayed trees

F+W: Timber felled under warrant

F-W: Timber felled without warrant

Fwd: Officers' Feewood. Listed at foot of oak entries for convenience. Could be any kind of wood, not necessarily oak. Figures are in loads.

For the other four categories double figures are given, the first being the number of trees, and the second being their weight in tons. Estimated figures are marked by an asterisk (see section 3 for the method of estimation).

1571: Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	11/12	11*/10			15*/14	2*/2		19/10	
Dod									
F+W		15/13		2/2		12/12	14/27	1/3	
F-W			2/3	1/1					3/4
Fwd						9			

1571: Beech

Mrf			2/2						
Dod									
F+W							2/4	11/28	
F-W									

1573: Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	67/8		7/2	5/6				1/2	2*/2
Dod							1/3		
F+W		17/31		2/3	6*/12			6/14	4/5
F-W									
Fwd							12		

1573: Beech

Mrf								3/24	
Dod							2/9		
F+W							2/2		
F-W									

1574:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	2/1		2/3				11/19	16/11*	
Dod									
F+W	30/60*		7/8	10/2	15/39		20/48	30/37	
F-W				5/1					2/3
Fwd				12		15			

1574:Beech

Mrf							12/8	19/7*	
Dod								21/26	
F+W							2/5		
F-W									

1576:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf		24/10	7/7		2/3	2*/2	2/2	12/7	
Dod							1/1		
F+W		241/482*		1/1				13/23	
F-W		86/164*			1/4		10/15	100/90*	
Fwd			12			12		26	

1576:Beech

Mrf			1/1		1/1*		5/4	3/2	
Dod									
F+W									
F-W					1/1*				

1579:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	11/7	17/20	6/6	1/1		3*/3	1/1	12/12	2/2
Dod									
F+W	3/4			2/3		9/6			
F-W					11*/21				
Fwd	9			35		24		26	33

1579:Beech

Mrf	2/2		1/5					6/4	
Dod									
F+W									
F-W							2/3	2/6	

1583:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	37/23	18/18	3/2	2/1	6*/5	4/3	5/5	4/5	
Dod									
F+W			8*/16	2/4		2*/4		1/3	
F-W		7/7							
Fwd	36	27	27	27	27	27	36	36	27

1583:Beech

Mrf			2/1		3*/2		6/3	6/3	
Dod									
F+W							2/9		
F-W									

1584:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	22/17	7/6	3/2		1/3			2/4	
Dod									
F+W	150/232	142/184*	58/106*	4/6	8/16*	15/30*	24/48*	96/192*	1/1
F-W									
Fwd	18	9	18	18	18	36	27	9	9

1584:Beech

Mrf							18/6		
Dod									
F+W							2/5		
F-W									

1585:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	29/14	11/10*	8/7*	4/2	19/38		24/21*	19/17*	
Dod	9/11	13/12*	13/12*		12/11*	7/6*	20/18*	6/5*	
F+W	6/7	12/24*		10/16		1/2*		1/1	1/2
F-W			2/1						
Fwd	36	12	12	12	12	12	37	50	12

1585:Beech

Mrf									
Dod									
F+W									
F-W									

1586:Oak

	Nth	Sth	Est+	Wst	Bat	Bur	Fri	Inn	God
Mrf	30/27*	27/24*		5/5*	34/30*		66/59*	34/30*	4/3*
Dod	40/37*	15/14*							
F+W				7/14*	15/30*	12/24*	18/36*	11/20	
F-W									
Fwd	39	12			12	12	37	88	12

+East included under South

1586:Beech

Mrf									
Dod									
F+W									
F-W									

1588:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	18/16*	5/4*	6/5*		9/8*				
Dod									
F+W	39/78*	88/176*	68/136*	2/3	25/50*		2/4*	81/162*	2/3
F-W									
Fwd	38	26	12	12	62	24	100	112	12

1588:Beech

Mrf									
Dod									
F+W							2/4		
F-W									

1589:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	54/49*	10/9*	9/8*	6/5*	11/10*		19/17*	9/8*	
Dod	38/34*	7/6*	4/3*		5/4*	3/3*	5/5*	13/12*	
F+W	37/74*			6/27				4/7	
F-W			2/4*			1/2*	17/32*		
Fwd	26	12	12	24	12	12	12	26	12

1589:Beech

Mrf									
Dod	9/5*	4/2*			35/21*		10/6*	18/11*	
F+W									
F-W									

1590:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	71/64*	10/9*	8/7*	10/9*	25/22*		46/41*	20/18*	7/6*
Dod		10/9*				100/90*+			
F+W	5/6				2/4*		16/32*		
F-W		1/2*					39/78*		
Fwd	38	12	12				12	26	12

+whole Forest by warrant

1590:Beech

Mrf									
Dod						100/90*+			
F+W					3/6*				
F-W		8/16*							

+whole Forest by warrant

1591:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	31/28*	5/4*	6/5*	3/3*	7/6*		6/5*	3/3*	
Dod									
F+W	2/4*								
F-W							1/2*		
Fwd	38	12	12	12	12	12	12	74	12

1591:Beech

Mrf									
Dod									
F+W									
F-W							2/4*		

1592:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	45/41*	7/6*	3/2*	10/9*	7/6*		8/7*	7/6*	
Dod									
F+W		1/2*							
F-W				2/4					
Fwd	26							26	

1592:Beech

Mrf	23/14*	7/4*	5/3*		10/6*		16/13*	14/8*	
Dod									
F+W									
F-W						2/4*			

1593:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	20/18*	10/9*		6/5*	17/15*		8/7		
Dod						2/2*			
F+W		36/72*			17/34*			11/22*	
F-W						1/2*	4/8*	2/4*	
Fwd							12	26	

1593:Beech

Mrf	10/6*	3/2*						1/2	
Dod									
F+W									
F-W									

1594:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	94/85*	19/17*	6/5*	14/13*	36/23*		72/65*	30/27*	
Dod						100/90*			
F+W		13/26*							240/576*
F-W				7/14*					
Fwd	26	12	12	12	12	12	12	12	12

1594:Beech

Mrf									
Dod									
F+W									
F-W									

1595:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	34/30*	14/13*		4/3*	4/4*		16/15*	6/5*	
Dod					2/2*				
F+W		11/11	10/20*	2/4*	22/47				
F-W									
Fwd	52						12	12	

1595:Beech

Mrf									
Dod									
F+W									
F-W									

1597:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	19/17*	5/4*	6/5*	4/3*	2/2*		15/14*		
Dod									
F+W+			15/30*	4/2					
F-W									
Fwd		50						50	12

+ felled in all Bailiwicks 706/1374*

1597:Beech

Mrf	10/6*						4/2*		
Dod									
F+W									
F-W									

1598:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	8/7*	4/3*	3/3*	5/4*	2/2*				
Dod								12/14*	
F+W	211/50	182/30	193/44					116/22	
F-W					2/4*				
Fwd	12	12	12	12	12	12	12	12	12

1598:Beech

Mrf	12/7*								
Dod									
F+W									
F-W							1/1		

1600:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf+	11*/10*	3*/3*	3*/3*	3*/3*	3*/3*		7*/6*	1*/1*	
Dod									
F+W									
F-W	all Bailiwicks 10/8*								
Fwd	all Bailiwicks 52								

+ Price per Bailiwick given. Number and volume estimated.

From 1600 onwards, the Certificates contain no figures for beech.

1601:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	11*/10*	2*/2*	2*/2*	1*/1*	1*/1*	2*/2*	8*/7*	2*/2*	2*/2*
Dod									
F+W									
F-W	5/8*						4/8		
Fwd									

1602:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	25/23*	2/2*	5/5*	2/2*	4/4*	3/3*	9/8*	4/4*	
Dod									
F+W	all Bailiwicks 299/568								
F-W	all Bailiwicks 6/11*								
Fwd	all Bailiwicks 110								

1603:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	27/10	5/5	5/3	3/1	7/1	3/2	7/4	5/3	
Dod									
F+W	all Bailiwicks 60*/100								
F-W									
Fwd	all Bailiwicks 52								

1604:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	43/39*	4/3*	4/4*	2/2*	4/10	3/3*	13/12*	3/3*	
Dod									
F+W			29/58*						
F-W								21/42*	
Fwd	all Bailiwicks 52								

1606:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	90/81*	23/21*	19/17*	20/18*	41/37*		54/49*	46/41*	2/2*
Dod									
F+W									
F-W		21/28*						120/120*	
Fwd	all Bailiwicks 52								

1624:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	25/22*	5/4*	4/4*	4/3*	3/3*		15/14*	7/5*	
Dod									
F+W									
F-W									
Fwd									

1632:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	47/42*	5/4*	4/3*	3/3*	4/4*		14/13*	4/3*	
Dod	92/80*			65/60*					65/60*
F+W+	1416/3115*					100/264*	206/453*	35/77*	
F-W									
Fwd									

+ Taken by warrant from various Bailiwicks for repairs 560/824.

1662:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf	52/42*	4/3*	8/6*	3/2*	15/12*		43/34*	6/5*	
Dod									
F+W	351/772*	87/191*					126/277*	33/72*	
F-W									
Fwd									

1670:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf									
Dod	all Bailiwicks 1690/2000*								
F+W	83/225	44/85	64/133	155/273		30/64	59/122	43/95	65/108
F-W									
Fwd									

1671:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf									
Dod	152/207*	211/173*	142/130*	166/178*	184/192*	861/750*	415/360*	50/69*	
F+W	299/573		20/29	155/343		95/155	186/291	48/44	5/13
F-W									
Fwd									

1672:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf									
Dod	380/574*	100/144*	332/176*	16/11*	10/7*		62/58*	3/3*	
F+W	42/96	96/204	2/5	11/28	33/72	28/58	79/190	4/10	10/25
F-W									
Fwd									

1673:Oak

	Nth	Sth	Est	Wst	Bat	Bur	Fri	Inn	God
Mrf									
Dod		8/6*			63/78*	89/119*	25/20*		
F+W	211/458	208/469	8/28	51/126	47/140	279/816	189/558	33/98	36/112
F-W									
Fwd									

Appendix 2: Totals

		No	No %	Ton	Ton %	Ratio
Nth	Mrf	882	37.2	701	34.4	0.8
	Dod	711	18.0	943	24.4	1.3
	F+W	2534	36.0	4982	36.6	1.9
	F-W	-	-	-	-	-
Sth	Mrf	253	10.7	220	10.8	0.9
	Dod	364	9.2	364	9.4	1.0
	F+W	1106	15.7	1809	13.3	1.6
	F-W	115	24.1	201	29.9	1.8
Est	Mrf	129	5.4	110	5.4	0.9
	Dod	491	12.4	321	8.3	0.7
	F+W	482	6.8	613	4.5	1.3
	F-W	6	1.3	8	1.2	1.3
Wst	Mrf	117	5.0	102	5.0	0.9
	Dod	247	6.3	249	6.6	1.0
	F+W	425	6.1	857	6.3	2.0
	F-W	15	3.1	20	3.0	1.3
Bat	Mrf	264	11.1	254	12.5	1.0
	Dod	276	7.0	294	7.6	1.0
	F+W	190	2.7	444	3.2	2.2
	F-W	14	2.9	29	4.3	2.0
Bur	Mrf	22	0.9	20	1.0	0.9
	Dod	1162	30.0	1060	27.5	0.9
	F+W	583	8.3	1435	10.5	2.5
	F-W	2	0.4	4	0.6	2.0
Fri	Mrf	419	17.7	385	19.0	0.9
	Dod	529	13.4	465	12.0	0.9
	F+W	813	11.6	1809	13.3	2.2
	F-W	78	16.3	147	21.9	1.9
Inn	Mrf	266	11.2	227	11.1	0.8
	Dod	78	2.0	98	2.5	1.2
	F+W	534	7.6	830	6.1	1.6
	F-W	243	50.8	256	38.1	1.0
God	Mrf	19	0.8	17	0.8	0.9
	Dod	71	1.7	65	1.7	0.9
	F+W	364	5.2	845	6.2	2.3
	F-W	5	1.1	7	1.0	1.4
Total	Mrf	2371	100	2036	100	0.9
	Dod	3929	100	3859	100	1.0
	F+W	7032	100	13624	100	2.0
	F-W	478	100	672	100	1.4

Appendix 3

P.R.O. E/178/3097 mem 36

Undated list, submitted by Thomas Hurst, of oaks marked for felling in 3 bailiwicks.

Burley Bailiwick, total 335

Burley 11

Berrie Wood 23

Clayhill and Rowhill 37

Sherewood and Beechwood 6

Cowpatch and Blackenford Green 12

Blackenford Wood 9

Wolvehill 12

Dogpitt 51

Oalde Rayles 4

Oalde Rayles near Cockrod 6

Cockroade 9

Sandhurst 48

Tames Lodge 6

Feny Ridge 9

Noemans Walk 3

Gibbes Hill 5

Winding Shoot 7

Below Winding Shoot 8

Hurthill 2

Anderwood 22

Cuckholde Hill 39

Lodge Brooke or Trendlie Water 5

Battramsley Bailiwick, total 262

Poundhill 19

Scragg Hill 23

Fragis Water and Fragis Hill 15

Shandhurst 34

Hursthill 20

Grotnham and the Salt Way 13 (2 beech)

Hunlie Banke 2 (1 beech)

Tarvers Coop 2

Denny Lodge 26

Long Beech Hill 28

Knight Wood 7

Wattcokesmore 34

Brinkton Wood 18

Blackbushe 3

Emette Hill 7

Brambell Hill 18

Fritham Bailiwick, total 475

Buckhill 15

Whitemore 5

Near Pillmoregate 17

Between Pillmoregate and Weeke,
Hussnes path near Deadmans More and
at Milliford 39

Weeke 26

Homehill and between the Waters 19

Stonewood 1

Puckpitt 27

Ilandwater near Hampton Ford 3

Marke Withie 7

Bell Lawn 7

Stockey Ford 2

Horstonehill 4

Blackbush 4

Noemans Walk 4

Winding Shoot 22

At the hill by Lodge Hole 6
(3 beech)

Iware and Studley Head 85

Elings Thornes 8

Queen North 18

Anstolls Wood 31

Bratlie 58

Stonewood near Hocknoll 1

Iland Water near Hocknoll 12

Hocknoll 27

Appendix 4 Many of the places listed in the survey can be identified. Where possible the present name and map reference is added in brackets.

'The book of survey' made by Roger Taverner in the seventh year of the reign of Queen Elizabeth (P.R.O. LRRO/5/39)

NEW FOREST

Burley Walk - 454 acres	acres
Homesley Covert - set with holmes, thornes and some oaks of great age (in Holmsley Inclosure SU 224008)	60
A little hat or parcell of wood lying above Osmands ford with thorne and oak (SU 234008)	2
Cardinall hat set with thornes (in Holmsley Inclosure SU 218002)	4
Aured Hill set with oaks	30
Batley and Stinking hedge set with oaks and thornes (Backley Inclosure SU 223074 and Stinking Edge Wood SU 228073)	4
Blakenford set with timber oaks and others (SU 234069)	14
Cooveldes hole set with oaks of timber and others	30
Rowehille alias Tames close set with oaks (Dames Slough Hill SU 253052)	4
Sandish set with oaks of timber and some beeches (Burley Old Inclosure SU 248042)	80
Cockrode hill set with shire oaks being firewood (SU 237041)	20
A parcell of wood called Yardley set with oak and beech (Little Early SU 229041)	6
Doggespitt set with oaks part timber (in South Oakley Inclosure SU 228052)	30
Berryhill set with oaks (Berry Wood SU 215054)	20

	acres
Rowehill set with oaks and some beech	12
Okeley Wood set with oak (SU 218049)	8
Cleyhill set with oaks	50
Bechehedd set with beech (Beechbed Inclosure SU 231064)	30
Yardeley Wood set with oak and beech (cancelled in original)	6
Hartehill set with oak (SU 242066)	6
Underseley set with oaks (Undersley Wood SU 227048)	12
Wolfehill set with oaks (Woolfield Hill SU 236064)	12
Ridley Wood set with old oaks which have been topp'd (SU 203060)	20

Frytham Walk - 884 acres

Buckehill set with old beeches (SU 280078)	60
A little hill nameless between Cleford and Slade Oak set with beech (SU 271069 between Clay Ford and Warwick Slade)	6
Horestones hill set with beeches (Hart Hill SU 262102)	60
Three Banks called Foxholes well set with beeches	60
A hill on the north side of Markewith set with beeches	8
A hill of wood by Lyndhurst Way between Caltoak and Merryford most part beech and some oak (Woodcrates SU 271083)	100
A hill of wood under Acras Downe set with beech (possibly The Knowles SU 267087)	14
A hill of wood at Rodegate set with beech	12
A parcell of wood from Pylmore gate to Shade Oak set with beeches (Broom Hill SU 277085)	20
Weke and Weke Banks and Bagges set with oak part timber and some beech (Wickwood SU 265094)	20
Puckpit set with oak (Puckpits SU 255097)	20
Holmeley Hills set with thornes and holmes (Holm Hill SU 257087)	10
Stridley hed set with oak the most part timber (Studley Head SU 224164)	16

	acres
Stonewood set with great oaken stubbs (Stonard Wood SU 258104)	3
Elings Thornes set with oak (Islands Thorns SU 218153)	6
Eyware Wood set with Oak (Eyeworth Wood SU 225149)	10
Quene orde set with oak (Queen, North SU 232133)	8
Old Bemley Coppice set with underwood of 34 years growth (South Bentley Inclosure SU 233128)	30
Anstyes wood set with oaks (Anses Wood SU 229125)	26
Yonge Bemley Coppice being set with underwood of 16 years growth (North Bentley Inclosure SU 240133)	30
Hocknoll Great wood set with oak (Ocknell Wood 240118)	10
Hocknoll Coppice set with underwood of 36 years growth (SU 247116)	30
Shrovehed adjoining thereto with oaks	18
Bratley wood set with oaks and some beech (Bratley Inclosure and SW part of Slufters Inclosure (SU 225090)	100
A hill upon Wylmers Green set with beeches	12
The Lodge Hole set with beeches and some oak	120
Winding Shete set with beeches and some oak (SU 243071)	70
Gibbes hill set with oaks	5

Batramsley Walk - 648 acres

The Hurst wood set with oaks and beeches (Hurst Hill SU 285055)	40
The Lynes set with oaks very thin	70
Bramble Hill set with great old oaks (SU 277069)	30
Brinkmarsh set with oaks and some beeches (Brinken Wood SU 277056)	40
Sethornes set with holmes and a few oaks (SZ 265996)	100
Bradley wood set with young oaks (within Broadley Inclosure SZ 253990)	10
Wotton wood alias Wotton Coppice now utterly destroyed (Wooton Coppice Inclosure SZ 253996)	140

	acres
Monken wood set with oaks, holmes and thorn (within Wilverley Inclosure SU 242007)	20
Wilverley heys set with thorns (within Wilverley Inclosure SU 244013)	8
Elmley Thorns set all with thornes (within Wilverley Inclosure SU 236007)	6
Sandhurst set with old oaks part timber(Sandis Wood in Rhinefield Sandys Inclosure SU 254043)	20
Shrewsbury hill with scrubbed oak and holmes	20
Rutsome Place set with old oaks part timber	40
Lymehill set with oaks and some beeches (Limey Hill, now part of Brinken Wood SU 275060)	7
Younge Beech hill set with oaks and x beeches (Vinney Ridge Inclosure SU 268054)	30
Vinner Wood set with oaks and holmes (Vinney Ridge SU 258055)	30
Quirte wood rode set with oak	5
Knyghtwood set with beeches (SU 265066)	12

North Bayliwick - 1190 acres

Halfpenny herne set with oak and beech (Busketts Wood SU 316111)	26
A parcell of wood lying from Crondal hill to Dagbourne along upon the water set with oak and beech	13
Stubbye Hat set with beeches (SU 307107)	8
Havers Hill set with oak and some beech (SU 305115)	16
Oldings Hatt set with beeches	2
Bromefield Hatt set with beeches	10
One little plott of beeches between Bromefield Hat and Malwood	3

	acres
A plott of wood between Newland End and Dagbournes set with oaks for most part	15
A plott of wood lying between Bromefield Hatt and Lady Crompton's Liberty set with oaks	7
A plott of wood lying between Darkeway hat and Malwood Lake set with beech	12
A plott of wood between Hampton Way and Black bushe set with oak (in Brockishill Inclosure SU 113300)	5
Hazle Hill with a Quillet of wood which lyeth by Purkesgate set with beeches (SU 291116)	17
Lambes Hatt set with oaks and some beeches (SU 297124)	8
The Middle Hatt set with beeches	4
Shawe gates Hatt set with oaks and some beech (Shave Hat SU 293126)	6
Rockryme and Mill potts set with oaks (SU 294133)	8
Black hedge and Huletts close set with oak	2
Hawxon Hill set with beech and some timber oaks	18
Crabtree hill set with beech and some oak (SU 290124)	2
One plott of wood lying between Crabtree hill and Marrons Cross set with beech and some oak	8
Cleyhill set with beech and some oak (SU 288118)	13
Sechen Hill set with oaks and some beeches	13
Clear Hatt set with beeches	14
Belchett set with oaks	24
Rowehill set with oak most part timber	2
Colmer Hill set with oak	10
Danes Hill set with oaks (SU 250134)	12
Pryors Acre set with timber oaks (in King's Garn Gutter Inclosure SU 255134)	26

	acres
Lynwood lying between the South Trench and the Middle Trench set most with oak (King's Garn Gutter Inclosure SU 255136)	200
Lynwood Coppice set with fair young timber oaks (SU 246144)	33
A plott of wood lying between the Middle Trench set with oaks (Coppice of Linwood Inclosure SU 249141)	240
Bramble wood set with oaks	80
Holme Hill set with oaks	100
A hill joining against Simon's hedge set with beech and some oak	11
Faire Hill set with oaks	20
A plott lying against Dibdore Bridge set with oaks	6
Ravensnest set with oaks (SU 256150)	16
Bignell set with oaks (SU 282133)	7
Little Malwood set for the most part with oaks	16
Brockers Hill set with beeches and some oak (SU 295115)	60
Muggshade hill set for the most part with oak	20
Lyvey hill set for the most part with beeches (SU 283125)	8
The Castle of Malwood set with beeches (SU 278122)	10
Long Beech hill set with oaks and beeches (SU 253128)	40

Westlynwood Walk - 345 acres

Rowhill wood set with ash and holme (SU 205089)	2
Lynwood set with oak, holme and thorne	10
Sloden set with ash, holme and thorne (SU 215127)	30
A plott between Woodford Corner and Hendolls Thorne	3
South Lynwood set with oaks and part timber	300

Goddeshill Bayliwick - 231 acres

Amberwood set with thornes, holmes and oaks (SU 210137)	12

	acres
Crokehill set with thornes, holmes and some oaks (SU 214146)	3
Yellyng Thornes set with the like (Islands Thorns SU 216149)	16
Ashley Hole likewise so set (SU 206152)	3
Brodstone Coppice set with hazle and shrubbed oak being underwood of 27 years growth	40
Northwood Coppice set with hazle and oak (SU 175174 see fig. 21)	27
Goddeshill sherewood set with oak and hazle (SU 173167)	80
Woodhalls thyn set with oaks which have been topped and much of the underwood destroyed (in Godshill Wood SU 168160)	50

Walk of East Bayliwick - 409 acres

The wood called Eastwood bounding upon South Langley set with old firewood oaks (now built up SU 448015)	8
Gatewood being utterly destroyed by John Harrison of Bewley and nothing there left but 50 straddles (SU 435010)	60
Tanters hill set with oaks (Tantany Wood SU 366044)	1
Woodfiddle set with oak part timber (Woodfidley SU 345045)	100
Dunney Wood set with oak part timber and with beeches (SU 333060)	160
Great Ashes, Little Ashes and Crookhill set with oak part timber and with beeches (Ashurst Wood SU 333094)	20
Southhatt with Lodge Bank set with oak, beech and bushes (Deerleap Inclosure SU 343092)	60

South Bayliwick - 589 acres

Pyngness hill set with oak part timber (Pignal Hill SU 319035)	16
Great Ashwell set with oak part timber	2

	acres
Ironshill Coppice lately destroyed by John Harrison and John Hayward (lay within New Copse Inclosure SU 328029)	50
Ironshill Coppice of 40 years growth bounding upon the aforesaid coppice (same as above)	60
Ironhill wood set with great oaks part timber (in Perrywood Ironshill Inclosure SU 327022)	16
Partridge Bush and Searceley wood set with great oak part timber (in New Copse Inclosure SU 334029)	5
Stubbye Coppice set partly with great oak timber (Stubby Copse Inclosure SU 328044)	40
Litten and Gisley wood set with oak part timber	240
Barmor Wood set with oak part timber	120
Stayninge hatt and Cochrode wood set with oak part timber (King's Hat SU 307054)	40

Inne Bayliwick - 540 acres

Whyttlewood set with oak most part timber (Whitley Wood SU 297055)	80
Gretton wood set with oak and beeches part timber (Gritnam Wood SU 287063)	60
Angnes Bank set with oak and beech (Annesley Bank SU 284069)	6
Old Lyndhurst, Emery Downe, Northwood and Pulmore wood set with oak and beech (Lyndhurst Hill SU 286081, Northerwood Inclosure SU 084290)	100
Towre Hatts bounding upon Veales gate near Lyndhurst set with beech (Foldsgate, formerly Foolsgate Hill SU 296094)	9
Fayre Cropte, Ironshill and Malwood bounding along by the water that goeth to Fletchwood set with oak and beech for timber (Fair Cross, Rushpole and Ironshill, SU 303094 to SU 316099)	280

	acres
Cossacles wood bounding upon Fletchwood set with oak and beech (Costicles Inclosure SU 327106)	4
One parcell of wood in Ippeley	1
Total woodlands within forest	5290 ac.

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PART II

INTRODUCTION

The work presented in this second part has two principal aims:

1. To assess the characteristics of the various uninclosed woodland types and to classify them using phytosociological ordination.

2. Using the data collected in the field, to assess the evidence in the woods, as they are today, for the historical changes discussed in Part I.

It is not possible at the moment to make any direct comparison between previously published work and that presented here. First, there has so far been no comparable quantitative study of the uninclosed woods in the New Forest. Second, the methods of the Wisconsin School, which are used here, have not, to my knowledge, been used in this country on high canopy forest. The studies using these methods, which have so far been carried out, are concerned with other types of vegetation (Gittens 1965, Goldsmith 1967).

1. CHOICE OF METHODS

The methodology used in this work was designed to satisfy certain conditions, the overriding one being that I would be working alone. The method had therefore to provide the highest level of information attainable by one man working without computer facilities for analysis.

Ordination

Since one of the aims of the study was site description and classification, methods of hierarchical analysis using presence/absence data, were considered inappropriate, quite apart from their dependence on computer facilities. The choice therefore lay between

the following methods of non-hierarchical ordination which arrange stands, in relation to a number of axes, in such a way that their degree of similarity is reflected by their spatial proximity:

Bray and Curtis with coefficient of community (1957)
Bray and Curtis with Euclidean distance (Beals 1960)
Principal Components Analysis
Factor Analysis

Of these, the first best satisfies the present conditions, because it does not require computer facilities for analysis on the present scale; there are further reasons for choosing it in preference to the others.

Bray and Curtis (1957) in discussing their choice of Gleason's (1920) coefficient of similarity $c = 2w/(a+b)$ as the basis for their ordination method, rejected Factor Analysis on three grounds: computational complexity, difficulty of interpretation, and the initial distortion of data brought about by the square transformation, which exaggerates the importance of entries with high values.

There has been much criticism of the Bray and Curtis method with coefficient of community, in the literature, for its lack of orthogonality; inter-stand distances produced using the Gleason coefficient are not true Euclidean distances and have been described as the product of an "erroneous coefficient" (Austin and Orloci 1966). Although some critics consider that the method has serious theoretical shortcomings, others have convincingly demonstrated certain inherent advantages.

Both Bray and Curtis (1957) and Austin (1972), in their discussions of linearity, point out that Euclidean methods make the unsupported

assumption that vegetation responds in a linear manner. "Most ecologists would not expect species to interact or respond to an environmental gradient in a linear manner, though current ordination methods assume this .... It is clear that the linear ordination methods which have been used are not compatible with the non-linear, non-monotonic conceptual model used by ecologists." (Austin 1972)

Beals, in his discussion of the relative ease of interpretation of the various methods, quotes Austin and Orloci (1966), who pointed out that "the Bray and Curtis two-dimensional model accounts for only 0.08% of the information, while two principal components account for over 55%." Beals continues: "But, in comparing their figures for three species patterns on the two ordinations, it is difficult to see any serious difference in those patterns." He also refers to Dagnelie's (1960) comparison of Bray and Curtis, and Factor Analysis, which showed a strong correlation ($r = +0.87$) between interstand distances arrived at by the two methods. Beals's comparative analysis of his own data using Euclidean distance and the "old-fashioned" coefficient of similarity $2w/(a+b)$, showed that "invariably the latter (and presumably cruder) distance gave ecologically more easily interpretable results". He goes on to say "Williams et.al. (1966) compared (because of its 'historical interest') the non-metric $2w/(a+b)$, with distance based on correlation, Pythagorean distance, standarized distance, and the information statistic. They were not ordering samples but classifying, yet it is instructive that $2w/(a+b)$ gave better ecological results than any of the other distance measures." (Beals 1973)

The ability of the Bray and Curtis model to give ecologically more informative results than the alternatives, has been demonstrated also by Bannister (1968), Newsome and Dix (1968), and Gauch and Whittaker

(1972). Gauch and Whittaker made comparative tests of eight ordination techniques using simulated data. Their results show that "under a variety of situations Bray and Curtis ordination with coefficient of community performs best and Principal Components analysis worst .... Two advantages of Bray - Curtis may be noted. First, the computational effort is enormously simpler than that of Principal Components analysis. Second, and more important, Bray-Curtis as a research technique is more lucid .... It is a principle of methodology in ecology that, given the complexity and curvilinearity of community data themselves, the more lucid means of analysing these data is to be preferred."

Austin (1972), referring to the objections raised to the Bray and Curtis model in his paper with Orloci (1966), says that the lack of success of the Bray and Curtis procedure may have been due to the fact that the data were left unstandardized.

I have used the method described by Bray and Curtis in 1957 which incorporates double standardization of the data. As ordination is being used as a classificatory method in the present study, the question of linearity is not critical. However, it may become so in the future, as I hope to carry out further research, in the same woods, on soils and other aspects of the physical environment.

Sampling

Ordination can be carried out on subjectively selected, systematic, or random data. The data for the present study have been gathered by random sampling.

The laying down of large randomly placed quadrats in woodland, which often contains a dense shrub layer, presents serious practical

difficulties. Plotless sampling methods are not only better suited to the physical conditions, but are more efficient than fixed plot methods in terms of information obtained per man-hour expended. Another advantage of plotless methods is the relatively small amount of equipment required.

Cottam and Curtis (1956) compared the performance, on a number of previously mapped woodland areas, of four possible methods: closest individual, nearest neighbour, random pairs, and point-centred quadrant. Their results show the point-centred quadrant method (described in detail below), to be the most efficient on several grounds.

1. Absolute density figures contained the lowest level of variability for a given number of distances.

2. Basal area measurements are less time consuming; the time taken per tree is the same for all methods, but the number of points to be plotted is lowest with the quadrant method.

3. Operator bias in placing the random point is lowest since four trees are involved at each site. Unconscious bias in point siting, for closest individual or nearest neighbour methods, seriously affects the distances recorded, whereas with the quadrant method such a deviation does not affect the mean of the four distances measured at any point.

2. CHOICE OF SITES

24 sites were subjectively chosen on the basis of the lichenological experience of Dr. Francis Rose, and my own experience of the structure of the uninclosed woods. The list of sites (whose locations in the

Forest are shown on fig. 28) was drawn up with two aims in mind: first, to include those blocks of old oak-dominated uninclosed woodland, thought on the basis of available information (mainly lichenological), to be ecologically most important; second, to include examples from the five woodland types listed below. (Each site, listed under the appropriate heading, is given a number which is used throughout Part II. Map references are given in the results section.)

1. Old oak-dominated uninclosed woods:

1.	Sunny Bushes	7.	South Brinken
2.	Bramshaw	8.	Whitley
3.	South Ocknell	9.	King's Hat
5.	Red Shoot	12.	Frame
6.	Pinnick		

2. Old beech-dominated uninclosed woods:

4.	Deazle Corner	22.	Little Stubby Hat
17.	Woodcrates	23.	Wooson's Hill
21.	Stricknage	24.	Rushpole

3. Secondary uninclosed woods, beech dominated:

10.	Eyeworth	19.	Bignell
15.	Broom Hill	20.	Great Wood

4. Old inclosures:

16.	Ocknell Inclosure	18.	Burley Old Inclosure
14.	Ocknell Inclosure (Coppice)		

5. Present-day inclosures:

11.	Amberwood Inclosure	13.	South Bentley Inclosure

3. METHODS

Sampling

The location, in woodland, of predetermined random points is not only difficult in practice, but open to the kind of unconscious subjective bias mentioned above. Points were therefore fixed in the field by random walk.

Within each wood an easily recognizable starting point was subjectively chosen, to enable areas to be re-examined. The consecutive legs of the walk were determined by random compass headings at ten degree intervals, and random pace distances from 1 to 100. An arbitrary right-turn constraint was imposed to keep the walk within the wood. When necessary 90 degree increments were added to the next heading to keep it within the study area.

The following procedure was carried out at twenty random points in each wood. The sampling point, fixed by random walk, is the centre of four quadrants whose orientation is given by the line of traverse just walked. The tree, in each quadrant, nearest to the point is taken as the sample. The distance from the point to each of the four trees was measured, the species recorded, and the breast height girth measured to the nearest 0.1m, giving data from 80 trees in each wood. To avoid seasonal variation of density due to seed setting and browsing, young trees below 1.5m in height were not recorded. Frequency figures of shrubs present were also recorded.

The data gathered in this way have been used for three purposes:

1. Importance Value Index (IVI)

This index was introduced by Curtis and McIntosh in 1951, as a method

of classifying stands on the basis of their quantitative characteristics. The index is calculated as follows:

Relative density, dominance and frequency figures are calculated for each species in the stand using the following equations:

$$\text{Relative Density} = \frac{\text{Number of individuals of the species}}{\text{Number of individuals of all species}} \times 100$$

$$\text{Relative Dominance} = \frac{\text{Total basal area of the species}}{\text{Total basal area of all species}} \times 100$$

$$\text{Relative Frequency} = \frac{\text{Total frequency of the species}}{\text{Total frequency of all species}} \times 100$$

The summation of the above three indices for each species gives the IVI for that species, out of a maximum of 300 for the stand. Curtis and McIntosh claim that this index is an excellent measure of the relative importance of each species in the stand.

The figures produced in this way not only show relative importance and biomass, but also provide the figures for the age-profiles.

Since the exact area of the woods was not known, it has not been possible to calculate absolute figures of density and dominance per unit area.

2. Age-profiles

Age-profiles, like population age-pyramids, have been produced for all woods studies (figs. 29-52), and fig. 53 shows the aggregate of the preceding 24 profiles. They divide the total numbers of *Quercus* and *Fagus* present in the stand into 0.2m girth classes. The possible ages of these classes ~~is~~ are discussed in section 5.

3. Ordination

The ordination uses some of the figures used in calculating the IVI.

The 24 woods as a whole contain 16 tree species and 5 shrub species. I tried the ordination first incorporating the shrubs, but the very high frequencies of Ilex and/or Crataegus in all woods tended seriously to mask the variance in the canopy species, and I have therefore excluded shrubs from the final ordination.

Figures of relative density and relative dominance for each of the 16 species were used, giving a total of 32 tests to be applied to each of the 24 stands. Standardization, to eliminate differences of abundance between species, is carried out at this stage by expressing the two scores for each species as a percentage of the maximum score attained by that test in any of the 24 stands. These two relative scores are summed to give a column for each wood, containing the total score for each of the 16 species; since only some of the species will be present in each stand, there will be some zero scores in each stand. The second standarization, to eliminate differences of abundance between stands, is carried out on these scores by expressing them as a percentage of the total stand score.

Because of the use of relative scores, the index, using the equation $2w/(a+b)$, is reduced to the calculation of w only, since $a+b = 2.00$ for all pairs, and $2w/2.00 = w$. w = the sum of the lesser scores for those species in common between any two stands.

The matrix of coefficients of community from the 276 pair comparisons appears below (table 6); increasing values represent increasing similarity. These scores are inverted (100-cf) to give the interstand distances used for constructing the ordination diagram.

Table 6, fold-out

The pair of stands having the greatest inter-stand distance provides reference points for the x axis. In this case two pairs, 2x11 and 13x11, have interstand distances of 99.1 units. Ramsay and de Leeuw (1965) made the choice between pairs having the same coefficient of community, by taking the pair with the lowest sum of total percentage scores of those species common to the stands in the pair. In this case both pairs have the same scores also. The choice was therefore based on the total of coefficients of community, stand 13 having a lower total than stand 2.

The interstand distance of 99.1 units between 2 and 11 defines the length of the x axis. Each of the other stands is then positioned along this axis by constructing an arc, from each reference point, whose radius in units equals the interstand distance between stand and reference stand. At the point of intersection of the two arcs, a perpendicular is dropped onto the first axis giving the position of the stand.

The y axis is constructed at right angles to the first, using as reference points, the two stands, both near the centre of the x axis, which have the lowest coefficient of community or greatest interstand distance. In this case there are three possible pairs, 5x19, 5x21 and 5x22, all having distances of 95.9. Using Ramsay and de Leeuw's method, 5x21 has the lowest score total. Not only is their similarity to each other very low, but they show great dissimilarity from the x axis reference stands, having an interstand distance along the x axis of 9.5 units.

The y axis is constructed in the sameway as the x axis, but using radii equal in units to the interstand distances from the new reference stands. The origin is located between the x axis positions of the

y axis reference stands. The points of intersection of the perpendiculars from each axis fix the position of stands in the two-dimensional space. The final diagram appears as fig. 55.

4. Results

This section contains quantitative data from each wood and accompanying age-profiles. As well as Relative Density (RDen), Relative Dominance (RDom), Relative Frequency (RFre) and IVI, described earlier, the Total Basal Area (TBA) for all examples of the species, Basal Area per tree (BA/Tr) both in square metres, and mean distance are given. This last figure is the mean tree to point distance of all 80 trees recorded from the stand.

Also listed is the total number of lichen species recorded in the wood, and the New Forest Index of Ecological Continuity (NFIEC). This index, which is a modification of the Revised Index introduced by Rose (1976), uses the percentage present of the 40 lichen species found to be most sensitive to ecological disturbance and which are the most important indicator species, in the New Forest, of habitat continuity. Both sets of figures have kindly been supplied by Dr. Rose.

The age-profiles show the number in each 0.2m girth class of Quercus and Fagus. Throughout these profiles Quercus appears on the left, Fagus on the right. Quercus robur is shaded, Q. petraea blank, and Q. petraea x robur black. King's Hat (site 9) contains the only hybrids recorded, i.e. with petraea-like cuneate leaves with long petioles, and peduncles.

Table 7. Total species list, all woods

Trees:

1. Quercus robur L.
2. Q. petraea (Mattuschka) Liebl.
3. Q. petraea x robur
4. Q. cerris L.
5. Fagus sylvatica L.
6. Fraxinus excelsior L.
7. Betula pendula Roth
8. B. pubescens Ehrh.
9. Acer campestre L.
10. A. pseudoplatanus L.
11. Sorbus aria (L.) Crantz
12. S. aucuparia L.
13. Taxus baccata L.
14. Malus sylvestris Mill.
15. Alnus glutinosa (L.) Gaertn.
16. Salix atrocinerea Brot.

Shrubs:

17. Ilex aquifolium L.
18. Crataegus monogyna Jacq.
19. Prunus spinosa L.
20. Frangula alnus Mill.
21. Viburnum opulus L.

(Nomenclature after Clapham, Tutin and Warburg 'Flora of the British Isles' second edition, 1962)

Table 8. Key to age-profiles

class no.	girth m.	estimated age (Quercus only)
1	0 - 0.2	
2	0.2 - 0.4	
3	0.4 - 0.6	C-generation 1940-1950
4	0.6 - 0.8	
5	0.8 - 1.0	
6	1.0 - 1.2	
7	1.2 - 1.4	B-generation 1850 - 1880
8	1.4 - 1.6	
9	1.6 - 1.8	
10	1.8 - 2.0	
11	2.0 - 2.2	
12	2.2 - 2.4	
13	2.4 - 2.6	
14	2.6 - 2.8	
15	2.8 - 3.0	
16	3.0 - 3.2	A2-generation 1725 - 1775
17	3.2 - 3.4	
18	3.4 - 3.6	
19	3.6 - 3.8	
20	3.8 - 4.0	
21	4.0 - 4.2	
22	4.2 - 4.4	A1-generation 1625 - 1675
23	4.4 - 4.6	
24	4.6 - 4.8	
25	4.8 - 5.0	
26	5.0 - 5.2	
27	5.2 - 5.4	
28	5.4 - 5.6	
29	5.6 - 5.8	

Site 1. Sunny Bushes (SU 259142)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus petraea	45.00	20.351	0.565	83.75	39.13	167.88
Fagus sylvatica	37.50	1.093	0.036	4.50	34.78	76.78
Quercus robur	7.50	2.495	0.416	10.27	8.70	26.47
Taxus baccata	3.75	0.224	0.075	0.92	6.52	11.19
Sorbus aria	3.75	0.079	0.026	0.32	6.52	10.59
Malus sylvestris	1.25	0.051	0.051	0.21	2.17	3.64
Sorbus ancuparia	1.25	0.007	0.007	0.03	2.17	3.45
Total	100.00	24.300		100.00	100.00	300.00
$\bar{x}$ all spp			0.304			

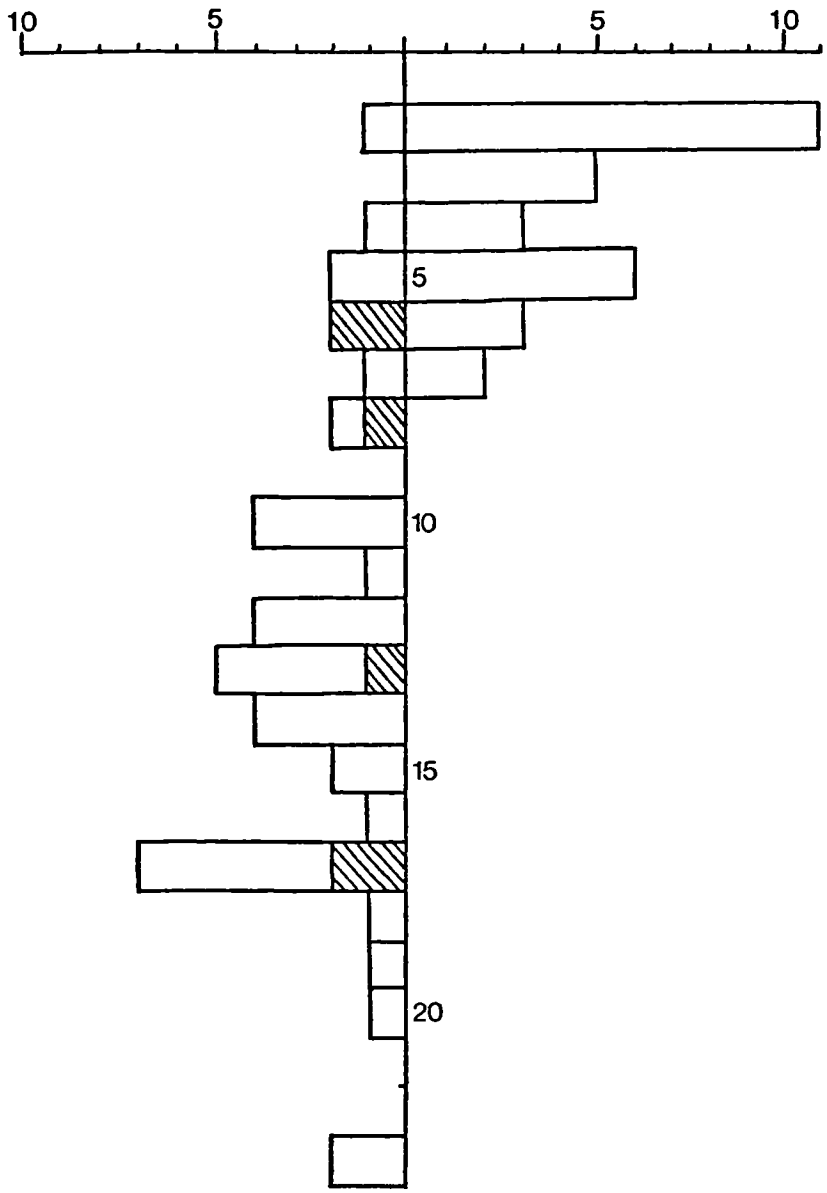
Shrub spp.	RFre
Ilex aquifolium	66.67
Crataegus monogyna	23.33
Prunus spinosa	6.67
Frangula alnus	3.33

Mean distance 6.85m

Lichen spp: 80

NFIEC: 60

Fig.29 Site1



Site 2. Bramshaw (SU 264160)

Parent material: Bracklesham Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus petraea	46.25	22.323	0.603	88.15	50.00	184.40
Fagus sylvatica	53.75	3.000	0.070	11.85	50.00	115.60
Total	100.00	25.323		100.00	100.00	300.00
$\bar{x}$ all spp.			0.317			

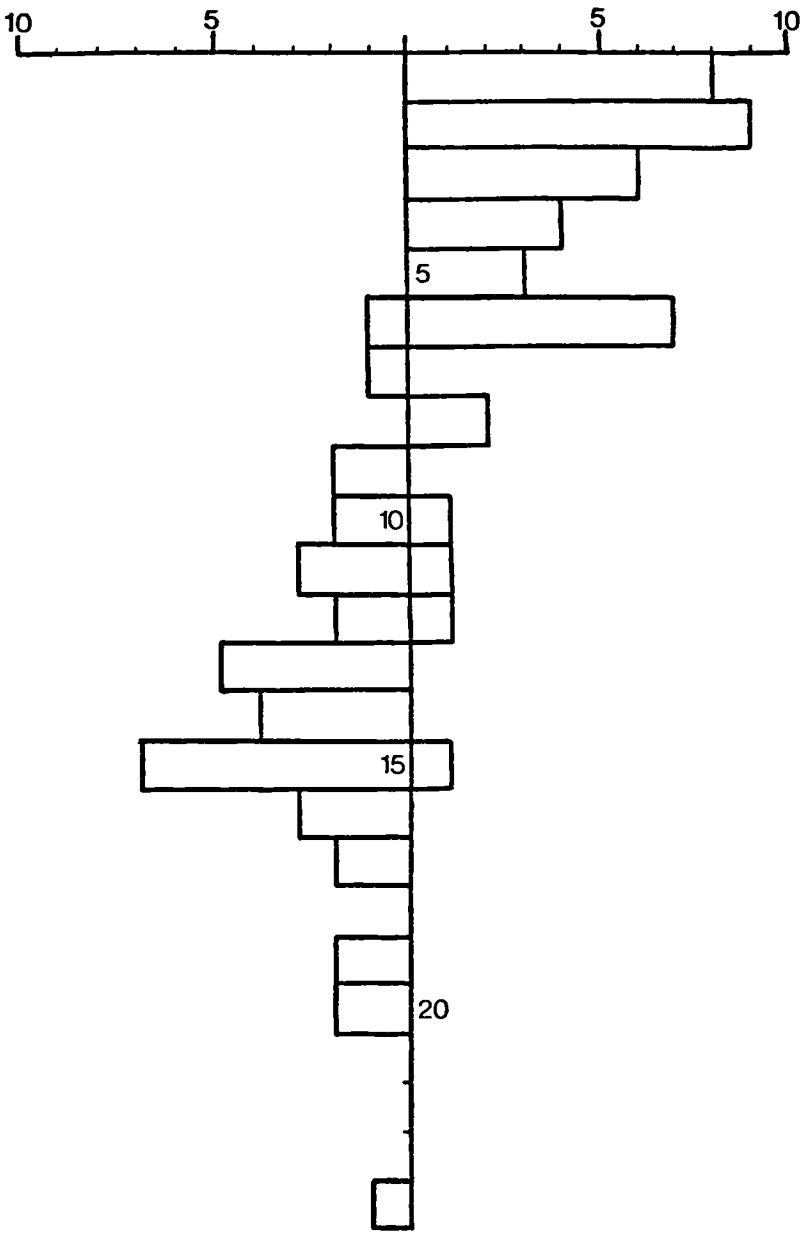
Shrub spp.	RFre
Ilex aquifolium	90.91
Crataegus monogyna	9.09

Mean distance: 5.82m

Lichen spp: 122

NFIEC: 73

Fig.30 Site 2



Site 3. South Ocknell (SU 246108)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	51.25	18.514	0.452	93.37	41.30	185.92
Fagus sylvatica	27.50	0.818	0.037	4.13	32.61	64.24
Fraxinus excelsior	17.50	0.294	0.021	1.48	19.57	38.55
Quercus petraea	1.25	0.134	0.134	0.68	2.17	4.10
Malus sylvestris	1.25	0.039	0.039	0.20	2.17	3.62
Betula pendula	1.25	0.029	0.029	0.15	2.17	3.57
Total	100.00	19.828		100.00	100.00	300.00
$\bar{x}$ all spp.			0.248			

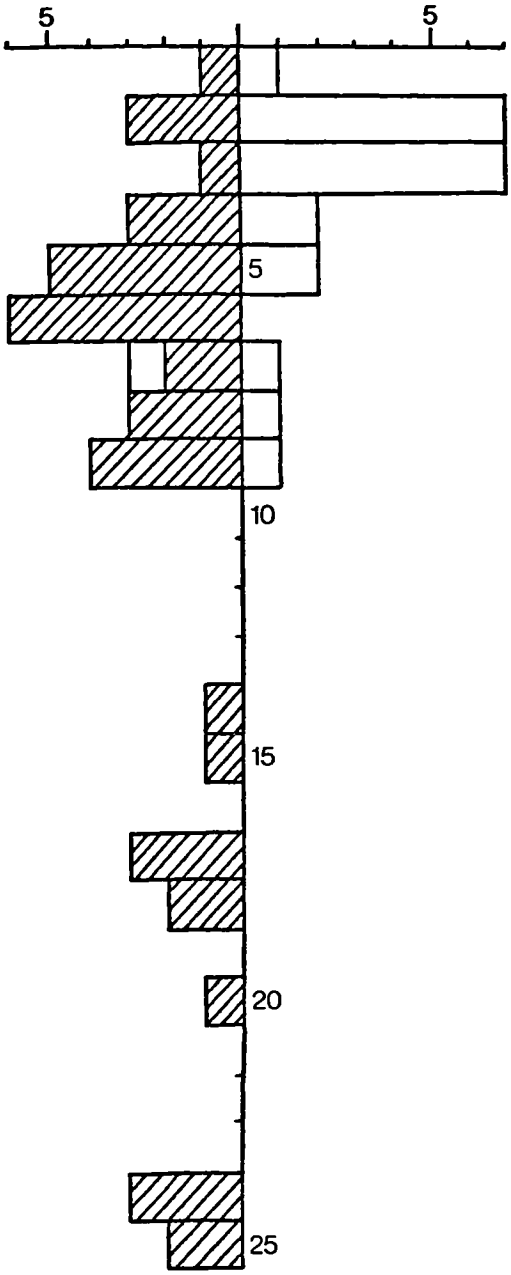
Shrub spp.	RFre
Ilex aquifolium	37.21
Crataegus monogyna	27.91
Prunus spinosa	20.93
Frangula alnus	13.95

Mean distance: 6.53m.

Lichen spp: 132

NFIEC: 75

Fig. 31 Site 3



Site 4. Deazle Corner (SU 263172)

Parent material: Bagshot Sands

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	72.50	21.954	0.379	89.01	51.28	212.79
Quercus robur	22.50	2.681	0.149	10.87	38.46	71.83
Betula pendula	3.75	0.009	0.003	0.04	7.69	11.48
Sorbus aucuparia	1.25	0.020	0.020	0.08	2.57	3.90
Total	100.00	24.664		100.00	100.00	300.00
$\bar{x}$ all spp.			0.308			

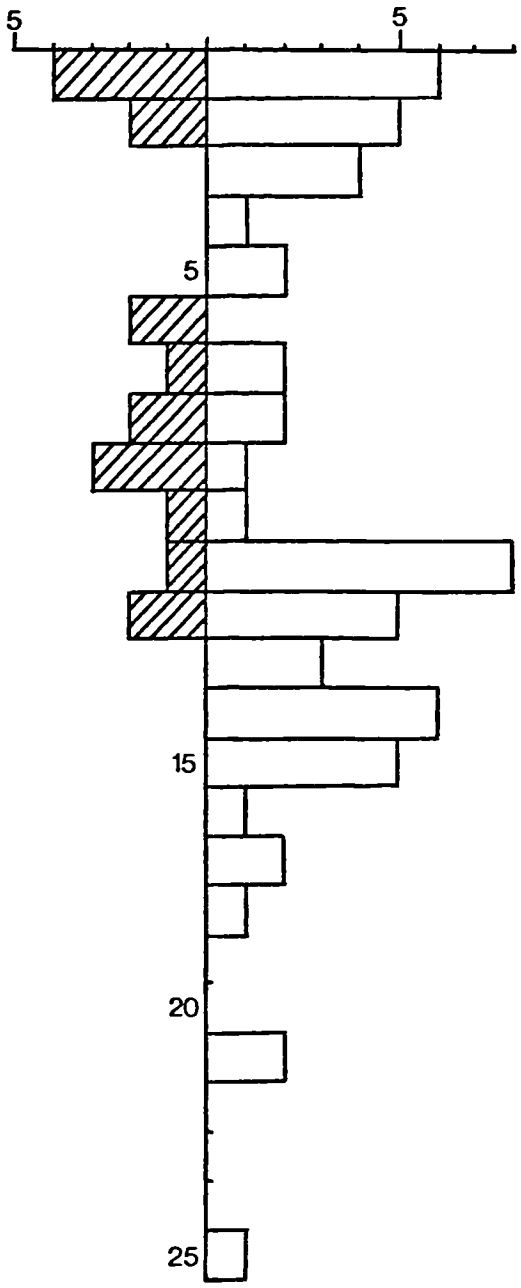
Shrub spp.	RFre
Ilex aquifolium	68.97
Frangula alnus	31.03

Mean distance: 8.19m.

Lichen spp: 45

NFIEC: 23

Fig. 32 Site 4



Site 5. Red Shoot (SU 184083)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus petraea	66.25	20.629	0.389	87.02	50.00	203.27
Q. robur	13.75	2.722	0.247	11.48	19.44	44.67
Fraxinus excelsior	7.50	0.016	0.003	0.07	11.11	18.68
Betula pubescens	5.00	0.063	0.016	0.27	5.56	10.83
B. pendula	3.75	0.240	0.080	1.01	5.56	10.32
Fagus sylvatica	2.50	0.023	0.012	0.10	5.56	8.16
Acer pseudoplatanus	1.25	0.013	0.013	0.05	2.77	4.07
Total	100.00	23.706		100.00	100.00	300.00
$\bar{x}$ all spp			0.296			

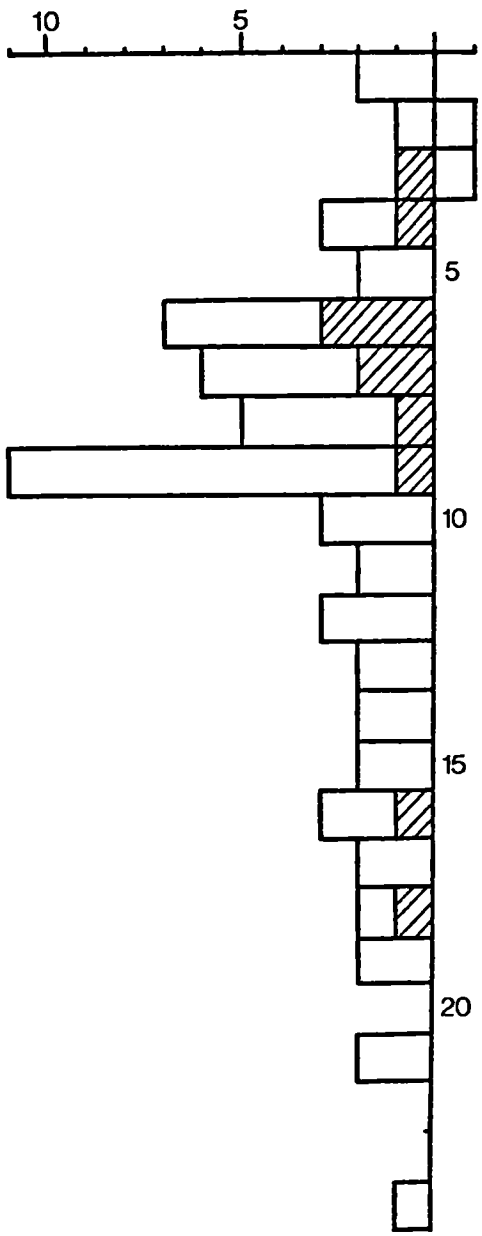
Shrub spp.	RFre
Ilex aquifolium	52.63
Crataegus monogyna	31.58
Prunus spinosa	15.79

Mean distance: 7.46m

Lichen spp: 122

NFIEC: 65

Fig.33 Site 5



Site 6. Pinnick (SU 192078)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	90.00	23.625	0.329	82.92	74.09	247.01
Q. petraea	5.00	4.705	1.176	16.51	11.11	32.62
Fagus sylvatica	1.25	0.080	0.080	0.28	3.70	5.23
Taxus baccata	1.25	0.039	0.039	0.14	3.70	5.09
Betula pendula	1.25	0.039	0.039	0.14	3.70	5.09
Malus sylvestris	1.25	0.003	0.003	0.01	3.70	4.96
Total	100.00	28.491		100.00	100.00	300.00
$\bar{x}$ all spp.			0.356			

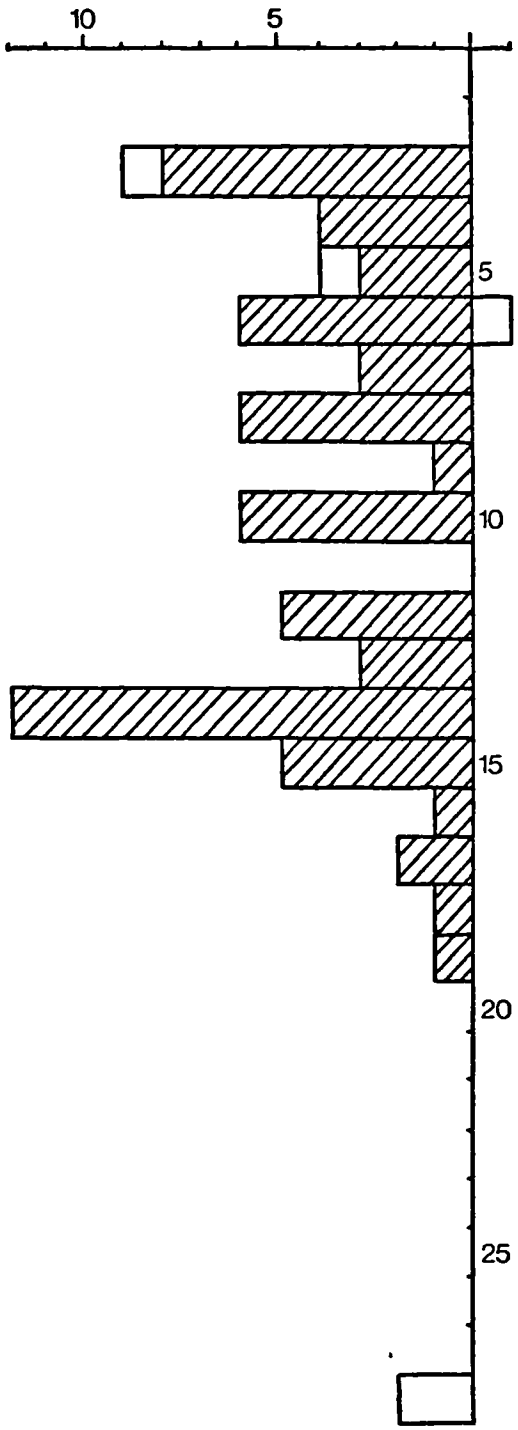
Shrub spp.	RFre
Ilex aquifolium	40.81
Crataegus monogyna	38.78
Prunus spinosa	20.41

Mean distance: 9.09m

Lichen spp: 90

NFIEC: 55

Fig.34 Site 6



Site 7. South Brinken (SU 282052)

Parent material: Valley Gravel

Tree spp.	RDen	TBA	TA/Tr	RDom	RFre	IVI
Quercus robur	55.00	19.466	0.442	85.35	40.91	181.26
Acer campastre	22.50	0.559	0.031	2.45	27.27	52.22
Fagus sylvatica	11.25	2.344	0.260	10.28	13.64	35.17
Fraxinus excelsior	10.00	0.236	0.030	1.03	15.91	26.94
Betula pendula	1.25	0.204	0.204	0.89	2.27	4.41
Total	100.00	22.809		100.00	100.00	300.00
$\bar{x}$ all spp.			0.285			

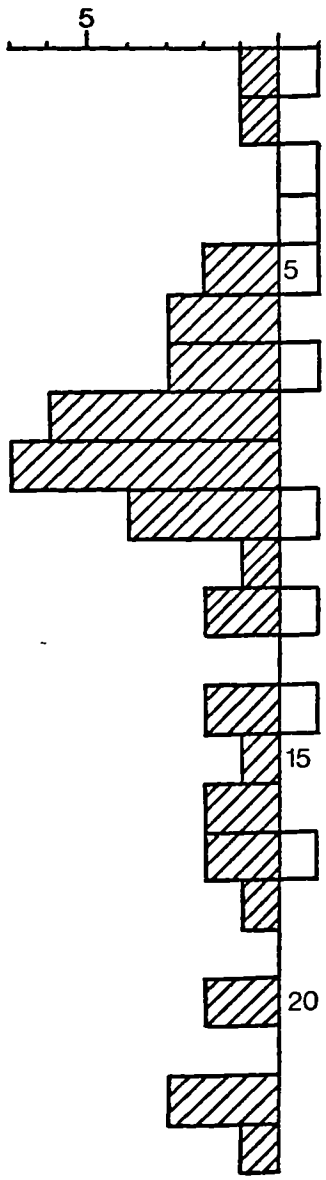
Shrub spp.	RFre
Crataegus monogyna	39.13
Ilex aquifolium	36.96
Prunus spinosa	19.57
Frangula alnus	2.17
Viburnum opulus	2.17

Mean distance: 7.06m

Lichen spp: 85

NFIEC: 65

Fig.35 Site 7



Site 8. Whitley (SU 297059)

Parent material: Barton Sand

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	53.75	23.861	0.555	77.37	44.4	175.57
Fagus sylvatica	27,50	6.077	0.276	19.70	31.11	78.31
Betula pendula	17.50	0.863	0.062	2.80	22.22	42.52
B. pubescens	1.25	0.039	0.039	0.13	2.22	3.60
Total	100.00	30.840		100.00	100.00	300.00
$\bar{x}$ all spp.			0.386			

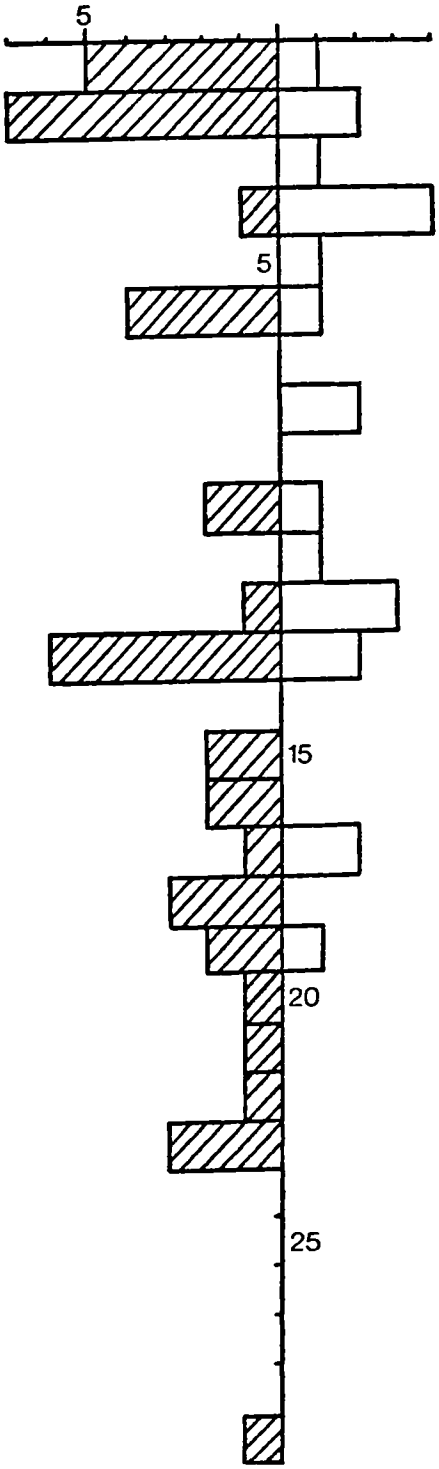
Shrub spp.	RFre
Ilex aquifolium	50.00
Crataegus monogyna	50.00

Mean distance: 7.55m

Lichen spp: 83

NFIEC: 50

Fig.36 Site 8



Site 9. King's Hat (SU 307054)

Parent material: Headon Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus petraea	40.00	15.783	0.493	54.24	35.56	129.80
Fagus sylvatica	40.00	7.623	0.238	26.20	42.22	108.42
Quercus robur	15.00	4.588	0.382	15.77	15.56	46.33
Q. petraea x robur	2.50	0.988	0.494	3.39	4.44	10.33
Betula pendula	2.50	0.115	0.058	0.40	2.22	5.12
Total	100.00	29.097		100.00	100.00	300.00
$\bar{x}$ all spp.			0.364			

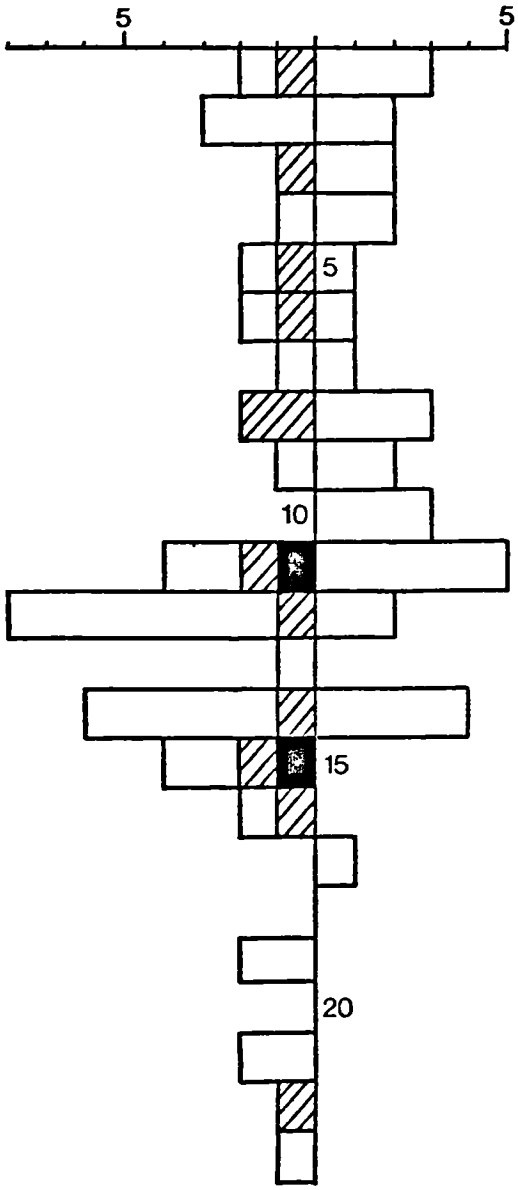
Shrub spp.	RFre
Ilex aquifolium	51.28
Crataegus monogyna	43.59
Prunus spinosa	5.13

Mean distance: 9.05m

Lichen spp: 106

NFIEC: 75

Fig.37 Site 9



Site 10. Eyeworth, north (SU 225156)

Parent material: Bracklesham Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	76.25	30.418	0.499	85.05	58.82	220.12
Quercus robur	20.00	4.902	0.306	13.71	35.30	69.01
Fraxinus excelsior	2.50	0.414	0.207	1.16	2.94	6.60
Taxus baccata	1.25	0.029	0.029	0.08	2.94	4.27
Total	100.00	35.763		100.00	100.00	300.00
$\bar{x}$ all spp.			0.447			

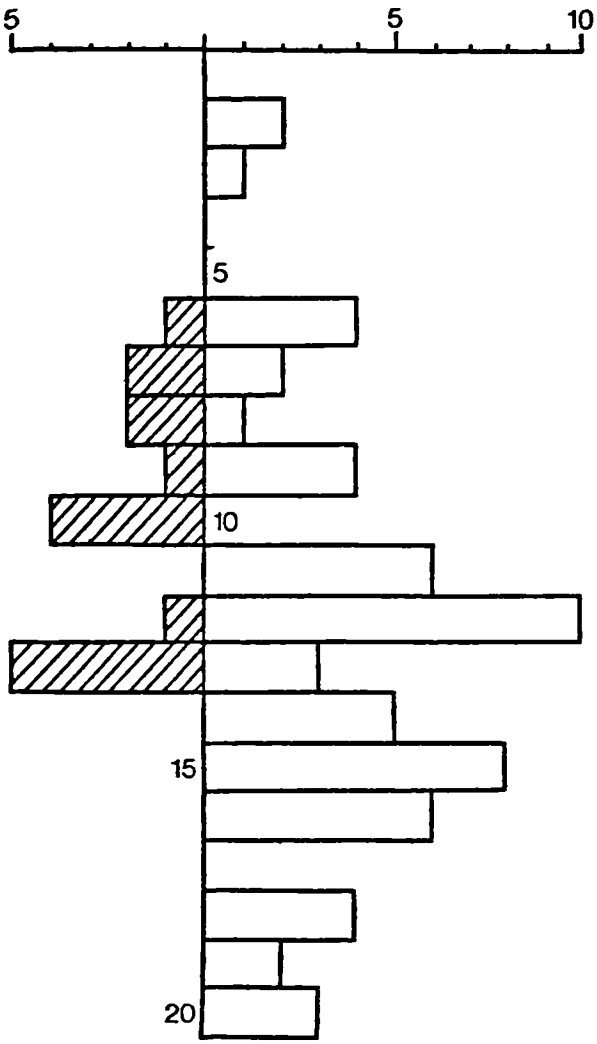
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 9.95

Lichen spp: 64

NFIEC: 50

Fig. 38 Site 10



Site 11. Amberwood (SU 209137)

Parent material: Bracklesham Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	98.75	19.630	0.248	99.98	95.24	293.97
Fagus sylvatica	1.25	0.003	0.003	0.02	4.76	6.03
Total	100.00	19.633		100.00	100.00	300.00
$\bar{x}$ all spp.			0.245			

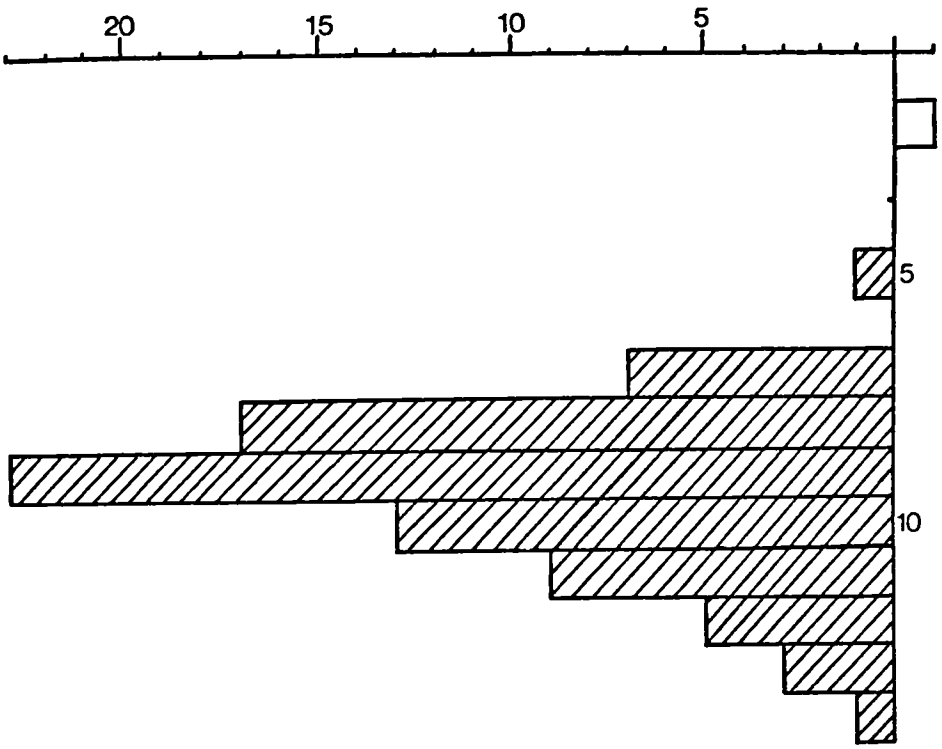
Shrub spp.	RFre
Crataegus monogyna	66.66
Ilex aquifolium	22.22
Prunus spinosa	11.11

Mean distance: 7.90m

Lichen spp: 38

NFIEC: 10

Fig.39 Site 11



Site 12. Frame (SU 358033)

Parent material: Headon Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	42.50	13.597	0.400	63.95	37.50	143.95
Fagus sylvatica	26.25	2.261	0.108	10.63	31.25	68.13
Betula pendula	20.00	1.677	0.105	7.89	18.75	46.64
Quercus petraea	11.25	3.728	0.414	17.53	12.50	41.28
Total	100.00	21.263		100.00	100.00	300.00
$\bar{x}$ all spp.			0.266			

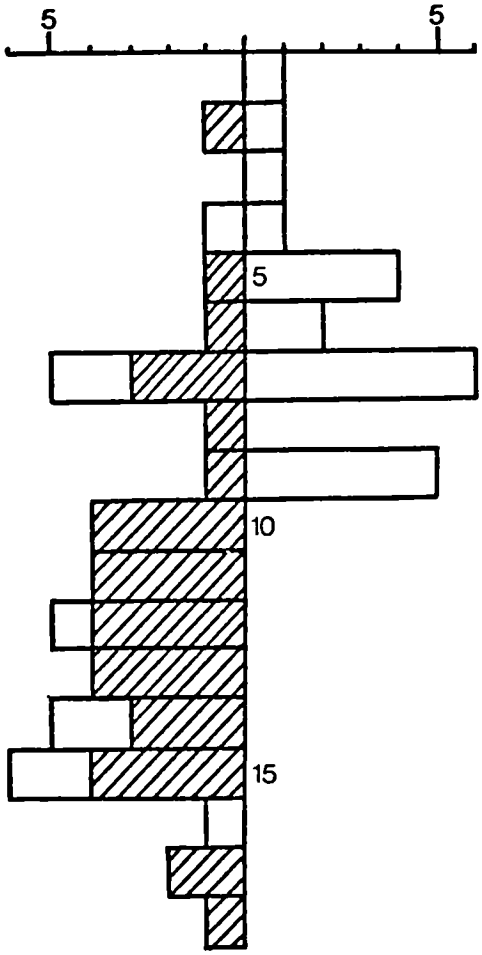
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 7.01

Lichen spp: 110

NFIEC: 75

Fig. 40 Site 12



Site 13. South Bentley (SU 234129)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus petraea	63.75	14.444	0.283	97.45	55.88	217.08
Fagus sylvatica	35.00	0.364	0.013	2.46	41.18	78.64
Betula pendula	1.25	0.013	0.013	0.09	2.94	4.28
Total	100.00	14.821		100.00	100.00	300.00
$\bar{x}$ all spp.			0.185			

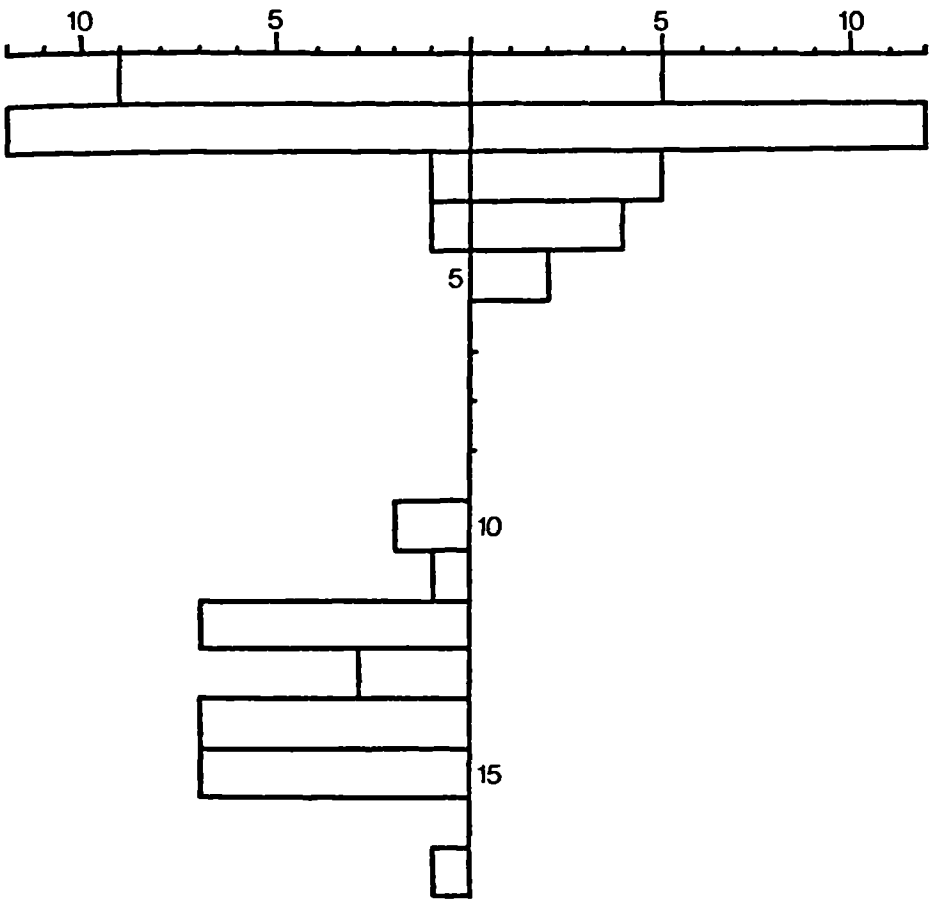
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 5.57m

Lichen spp: 49

NFIEC: 25

Fig. 41 Site 13



Site 14. Ocknell Inclosure (former coppice area) (SU 248115)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Quercus robur	48.75	13.760	0.353	53.46	48.65	150.86
Fagus sylvatica	48.75	10.945	0.281	42.52	45.95	137.22
Quercus petraea	2.50	1.035	0.518	4.02	5.40	11.92
Total	100.00	25.740		100.00	100.00	300.00
$\bar{x}$ all spp.			0.322			

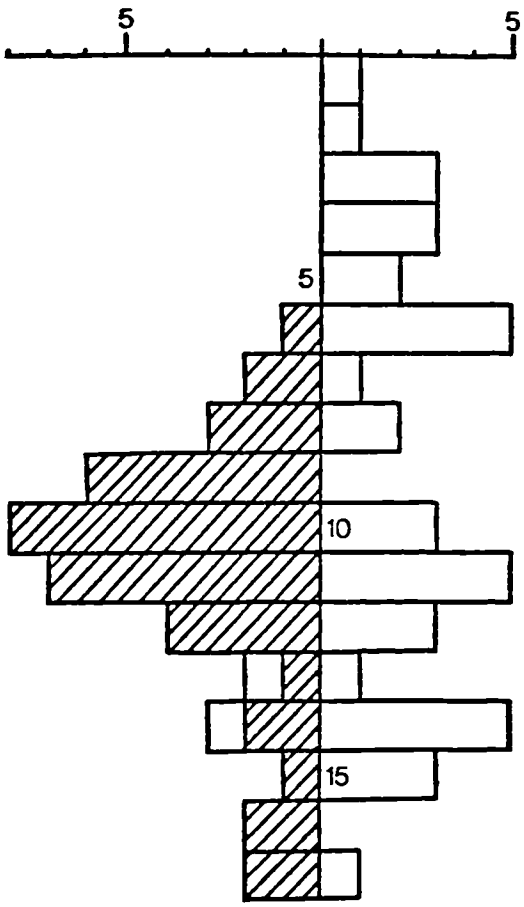
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 8.olm

Lichen spp: 68

NFIEC: 35

Fig. 42 Site 14



Site 15. Broom Hill (SU 264146)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	76.25	24.059	0.394	79.13	54.05	209.43
Quercus robur	13.75	4.209	0.383	13.85	27.03	54.63
Taxus baccata	8.75	0.664	0.095	2.18	16.22	27.15
Quercus petraea	1.25	1.471	1.471	4.84	2.70	8.79
Total	100.00	30.403		100.00	100.00	300.00
$\bar{x}$ all spp.			0.380			

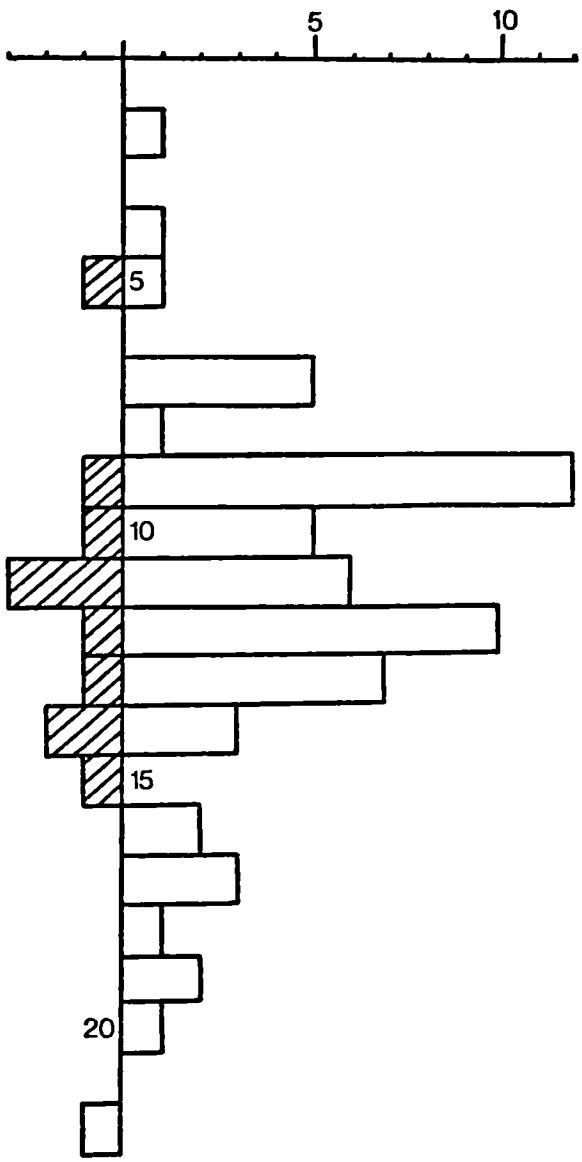
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 8.76m

Lichen spp: 22

NFIEC: 5

Fig 43 Site 15



Site 16. Ocknell Inclosure (SU 244117)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	61.25	24.371	0.497	65.81	50.00	177.06
Quercus petraea	21.25	9.277	0.546	25.05	25.00	71.30
Q. robur	16.25	3.363	0.259	9.08	22.50	47.83
Taxus baccata	1.25	0.020	0.020	0.06	2.50	3.81
Total	100.00	37.031		100.00	100.00	300.00
$\bar{x}$ all spp.			0.463			

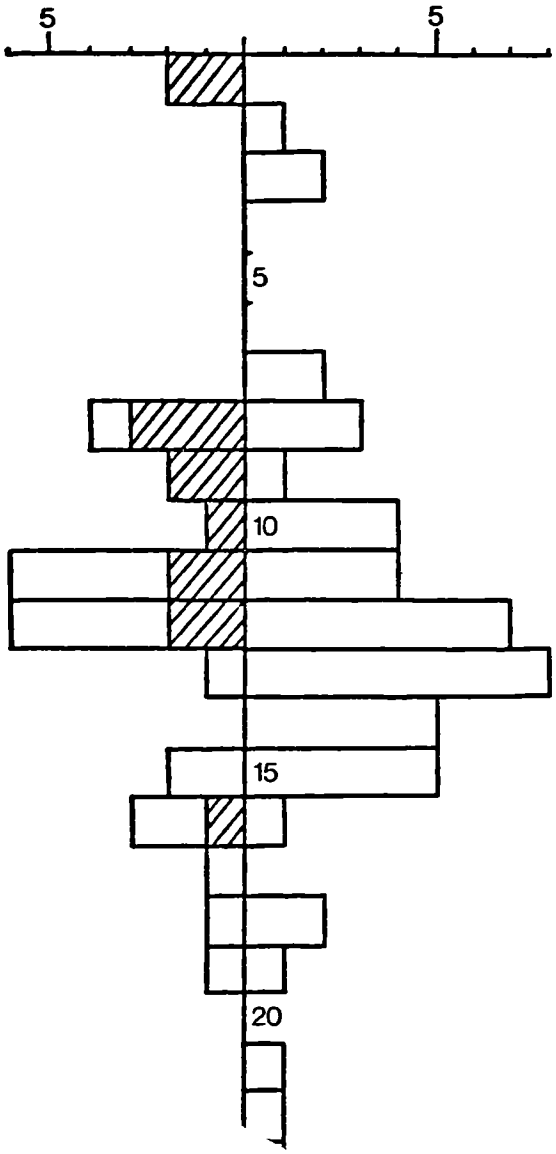
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 9.65 m

Lichen spp: 87

NFIEC: 40

Fig 44 Site 16



Site 17. Woodcrates (SU 271083)

Parent material: Barton Sand

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	68.75	29.717	0.540	86.59	51.43	206.77
Quercus robur	23.75	4.423	0.233	12.89	31.43	68.07
Betula pendula	2.50	0.143	0.072	0.42	5.71	8.63
Malus sylvestris	2.50	0.023	0.012	0.07	5.71	8.28
Taxus baccata	1.25	0.007	0.007	0.02	2.86	4.13
Salix atrocinerea	1.25	0.003	0.003	0.01	2.86	4.12
Total	100.00	34.316		100.00	100.00	300.00
$\bar{x}$ all spp.			0.429			

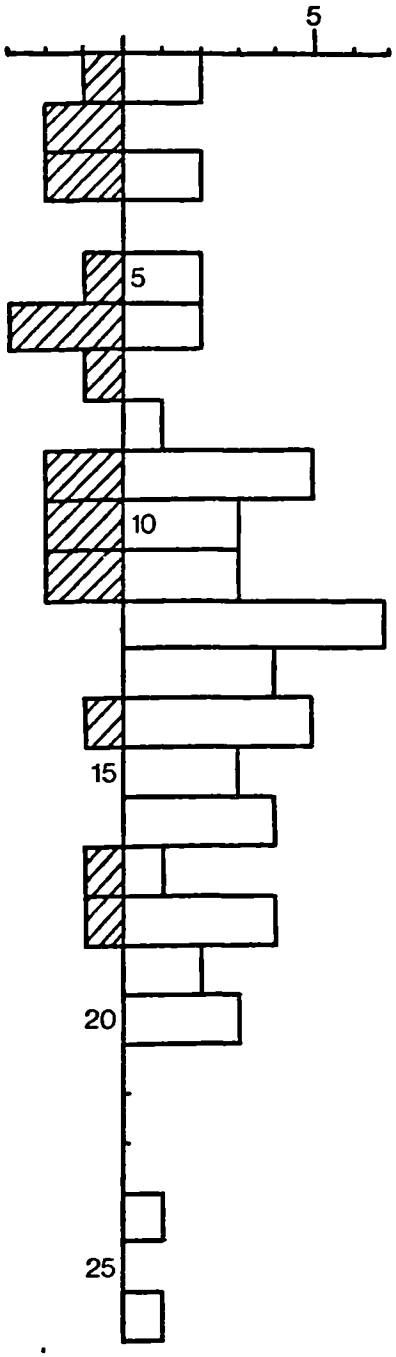
Shrub spp.	RFre
Ilex aquifolium	85.00
Frangula alnus	10.00
Prunus spinosa	5.00

Mean distance: 9.71m

Lichen spp: 128

NFIEC: 53

Fig.45 Site 17



Site 18. Burley Old Inclosure (SU 245042)

Parent material: Mainly Barton Clay, part Barton Sand

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	51.25	13.696	0.334	44.31	37.50	133.06
Quercus robur	36.25	16.387	0.565	53.02	40.00	129.27
Betula pendula	7.50	0.325	0.054	1.05	12.50	21.05
Quercus cerris	2.50	0.358	0.179	1.16	5.00	8.66
Taxus baccata	1.25	0.080	0.080	0.26	2.50	4.01
Betula pubescens	1.25	0.064	0.064	0.20	2.50	3.95
Total	100.00	30.910		100.00	100.00	300.00
$\bar{x}$ all spp.			0.386			

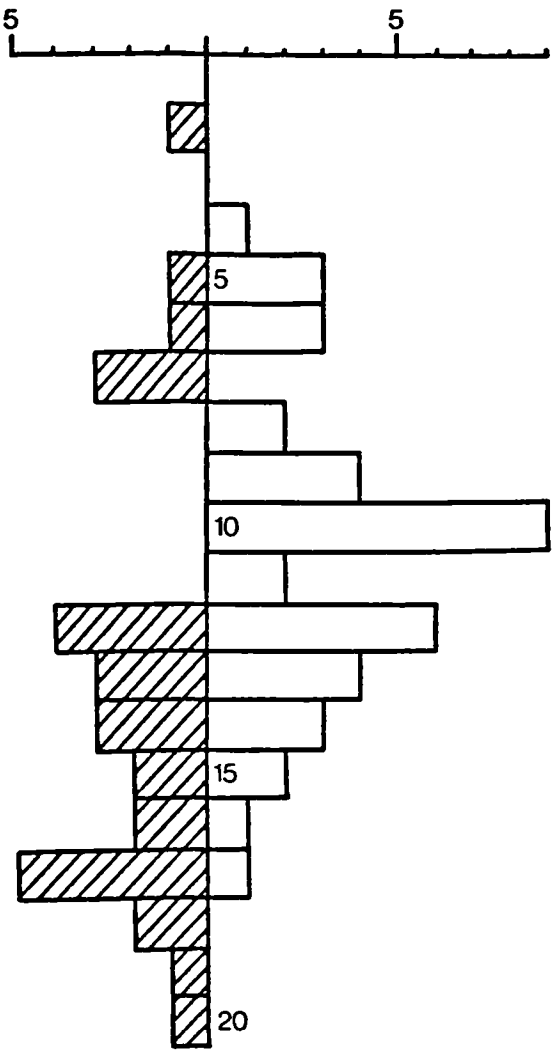
Shrub spp.	RFre
Ilex aquifolium	83.33
Crataegus monogyna	8.33
Frangula alnus	8.33

Mean distance: 8.33m

Lichen spp: 97

NFIEC: 63

Fig.46 Site 18



Site 19. Bignell (SU 282133)

Parent material: Bracklesham Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	78.75	13.854	0.220	86.19	62.50	227.44
Quercus robur	20.00	2.219	0.139	13.80	34.38	68.18
Malus sylvestris	1.25	0.001	0.001	0.01	3.12	4.38
Total	100.00	16.074		100.00	100.00	300.00
$\bar{x}$ all spp.			0.201			

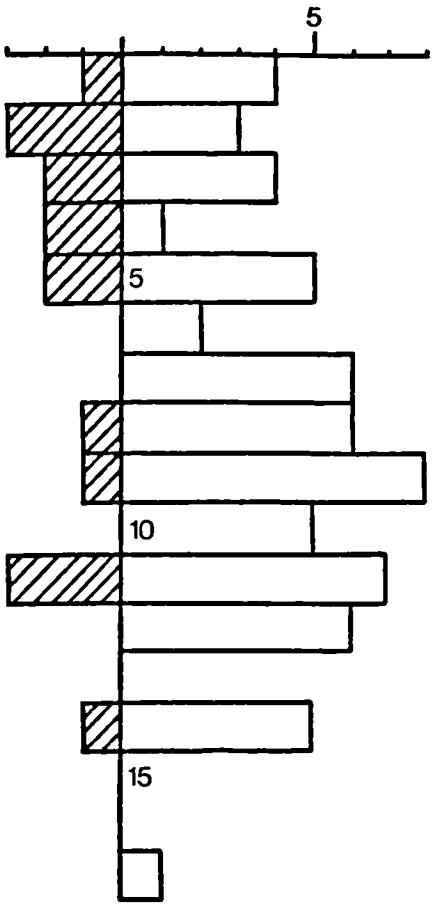
Shrub spp.	RFre
Ilex aquifolium	95.24
Frangula alnus	4.76

Mean distance: 6.24m

Lichen spp: 71

NFIEC: 43

Fig. 47 Site 19



Site 20. Great Wood (SU 258156)

Parent material: Bracklesham Beds

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	67.50	14.496	0.268	57.80	54.28	179.58
Quercus petraea	27.50	10.326	0.469	41.18	37.14	105.82
Sorbus aria	2.50	0.049	0.025	0.20	2.86	5.56
Quercus robur	1.25	0.156	0.156	0.62	2.86	4.73
Taxus baccata	1.25	0.051	0.051	0.20	2.86	4.31
Total	100.00	25.078		100.00	100.00	300.00
$\bar{x}$ all spp.			0.313			

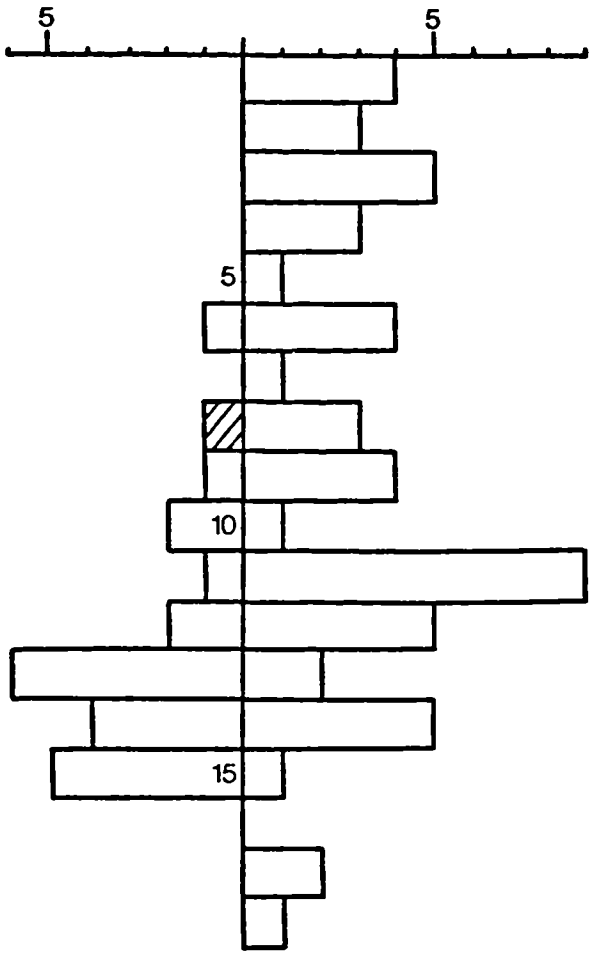
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 9.42m

Lichen spp: 42

NFIEC: 35

Fig. 48 Site 20



Site 21. Stricknage, stream valley (SU 261125)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	70.00	10.332	0.185	86.94	54.55	211.49
Quercus robur	23.75	1.340	0.071	11.27	33.33	68.35
Alnus glutinosa	3.75	0.166	0.055	1.40	9.09	14.24
Sorbus aria	2.50	0.046	0.023	0.39	3.03	5.92
Total	100.00	11.884		100.00	100.00	300.00
$\bar{x}$ all spp.			0.149			

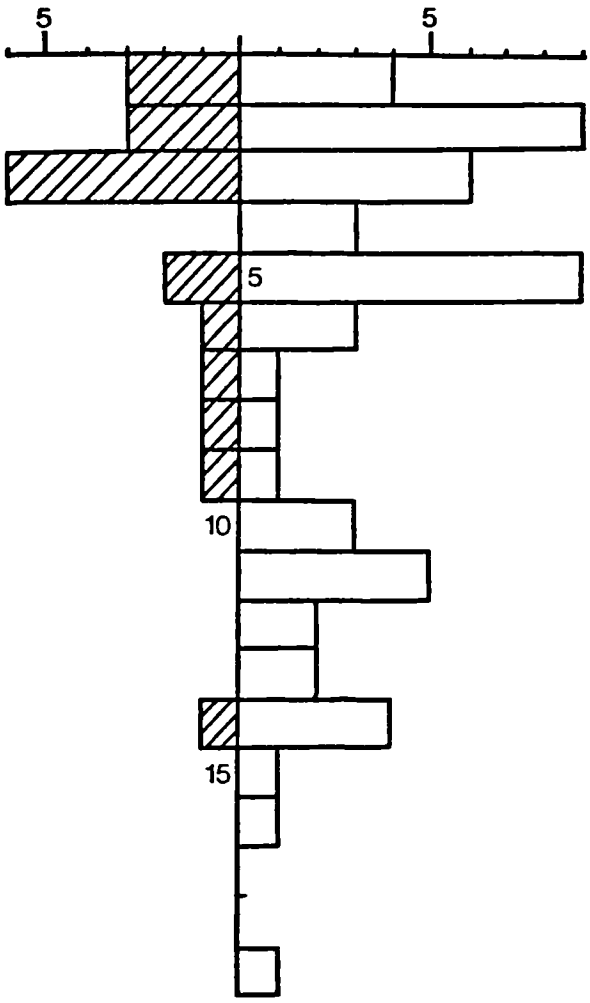
Shrub spp.	RFre
Ilex aquifolium	64.52
Crataegus monogyna	29.03
Prunus spinosa	6.45

Mean distance: 5.83m

Lichen spp: 115

NFIEC: 70

Fig. 49 Site 21



Site 22. Little Stubby Hat (SU 306107)

Parent material: Barton Clay

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	75.00	11.634	0.194	89.24	60.61	224.85
Quercus robur	25.00	1.403	0.070	10.76	39.39	75.15
Total	100.00	13.037		100.00	100.00	300.00
$\bar{x}$ all spp.			0.163			

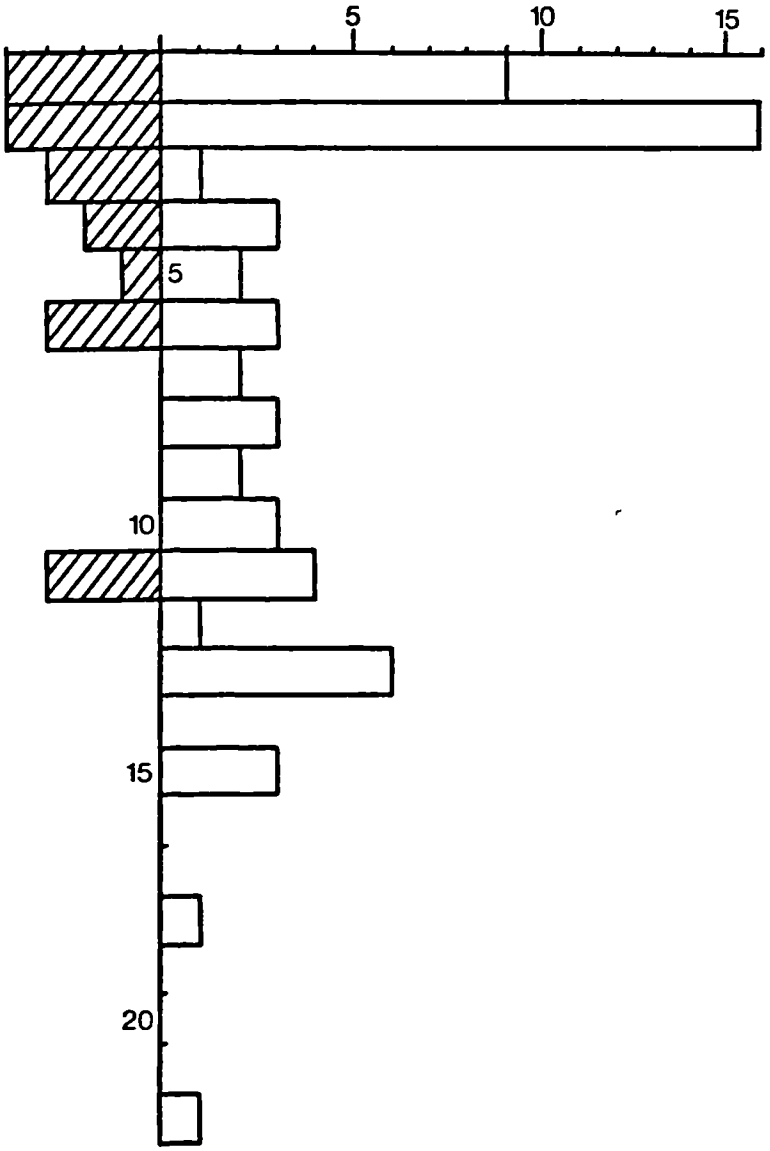
Shrub spp.	RFre
Ilex aquifolium	76.92
Crataegus monogyna	23.08

Mean distance: 5.53m

Lichen spp: 122

NFIEC: 60

Fig. 50 Site 22



Site 23. Wooson's Hill (SU 256077)

Parent material: Barton Sand

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	66.25	31.482	0.594	96.68	51.28	214.21
Quercus robur	20.00	0.625	0.039	1.92	23.08	45.00
Betula pendula	7.50	0.175	0.029	0.54	12.82	20.86
Sorbus aucuparia	3.75	0.275	0.092	0.84	7.70	12.29
Betula pubescens	1.25	0.003	0.003	0.01	2.56	3.82
Malus sylvestris	1.25	0.003	0.003	0.01	2.56	3.82
Total	100.00	32.563		100.00	100.00	300.00
$\bar{x}$ all spp.			0.407			

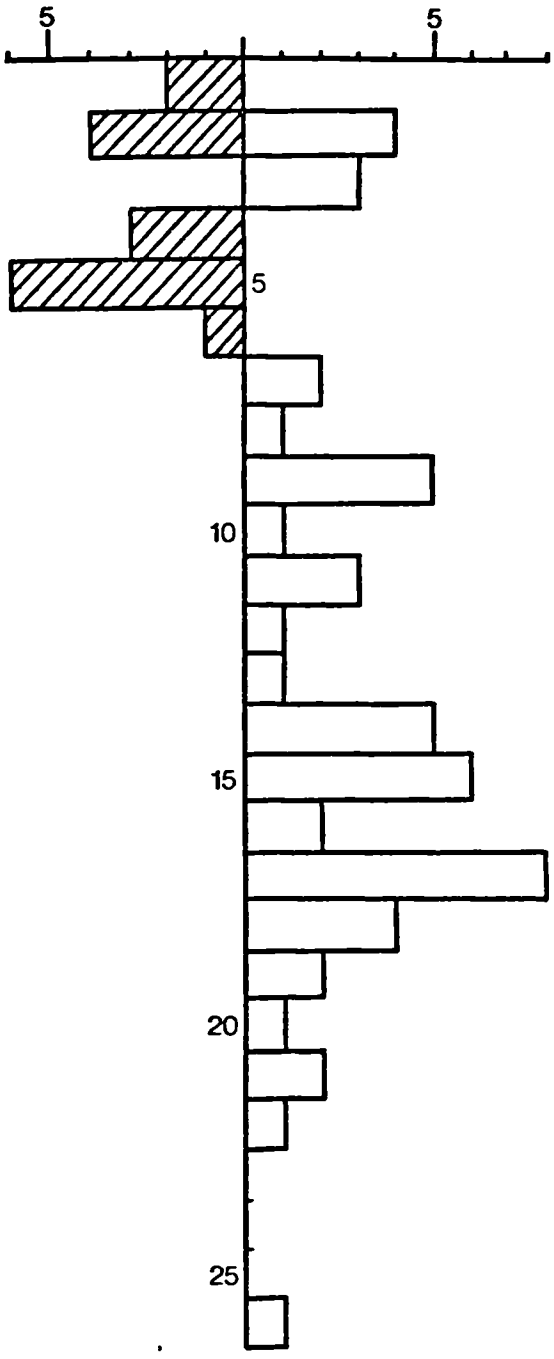
Shrub spp.	RFre
Ilex aquifolium	100.00

Mean distance: 10.90m

Lichen spp: 125

NFIEC: 65

Fig.51 Site 23



Site 24. Rushpole (SU 309099)

Parent material: Barton Clay and Barton Sand

Tree spp.	RDen	TBA	BA/Tr	RDom	RFre	IVI
Fagus sylvatica	63.75	20.833	0.408	95.63	52.94	212.32
Quercus robur	31.25	0.819	0.033	3.76	35.30	70.31
Sorbus aucuparia	2.50	0.040	0.020	0.18	5.88	8.56
Betula pendula	1.25	0.080	0.080	0.37	2.94	4.56
Malus sylvestris	1.25	0.013	0.013	0.06	2.94	4.25
Total	100.00	21.785		100.00	100.00	300.00
$\bar{x}$ all spp.			0.272			

Shrub spp.	RFre
Ilex aquifolium	81.82
Frangula alnus	13.64
Crataegus monogyna	4.54

Mean distance: 7.05m

Lichen spp: 127

NFIEC: 58

Fig. 52 Site 24

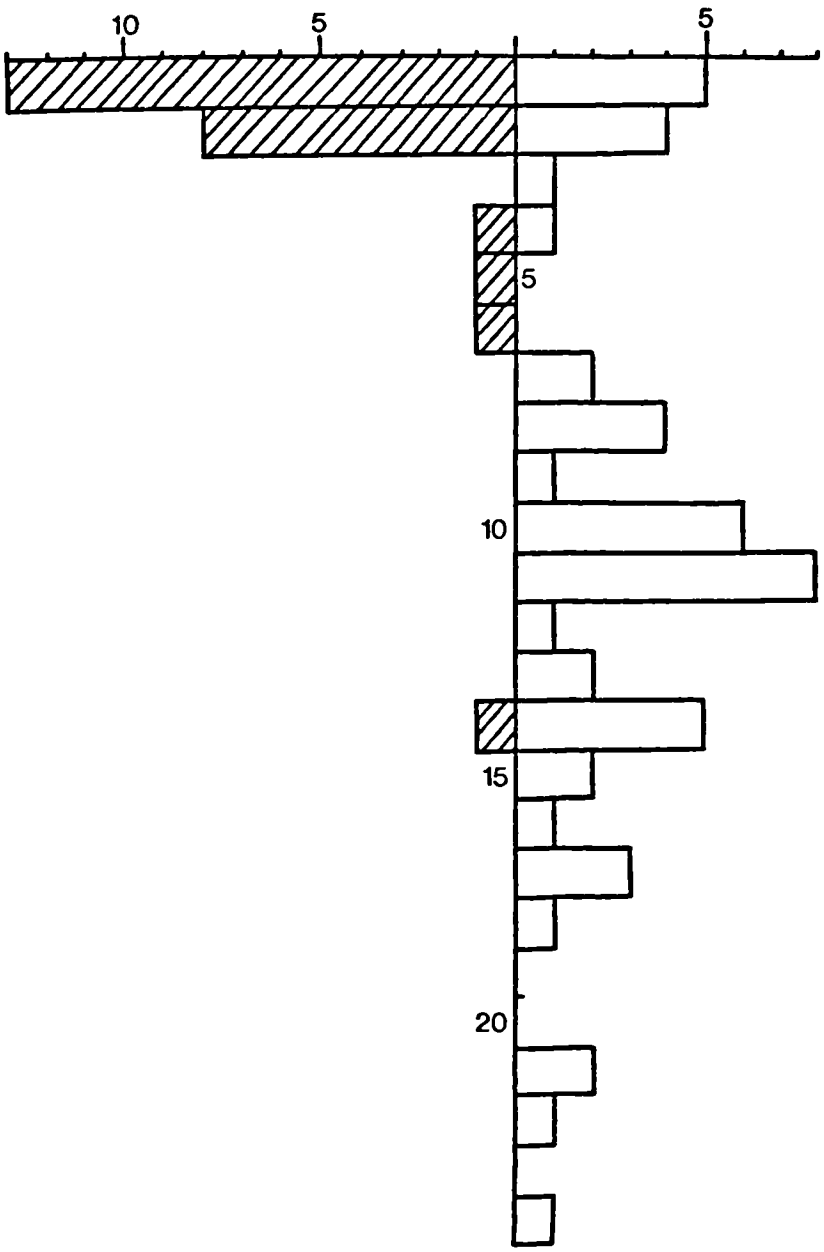


Fig. 53 Figs 29 - 52 combined

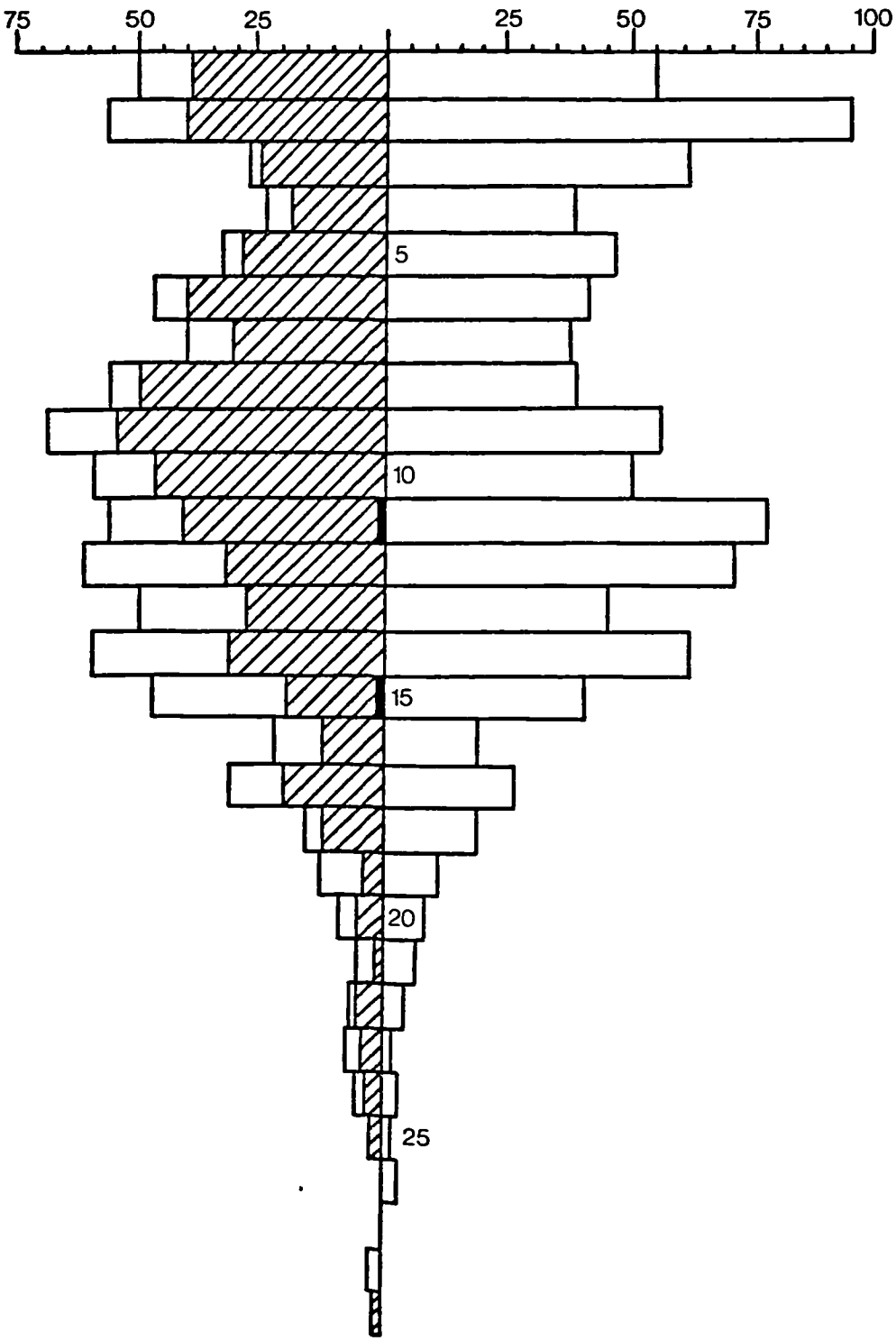


Fig. 54 Percentages, by girth class, of Quercus, sites 1-24

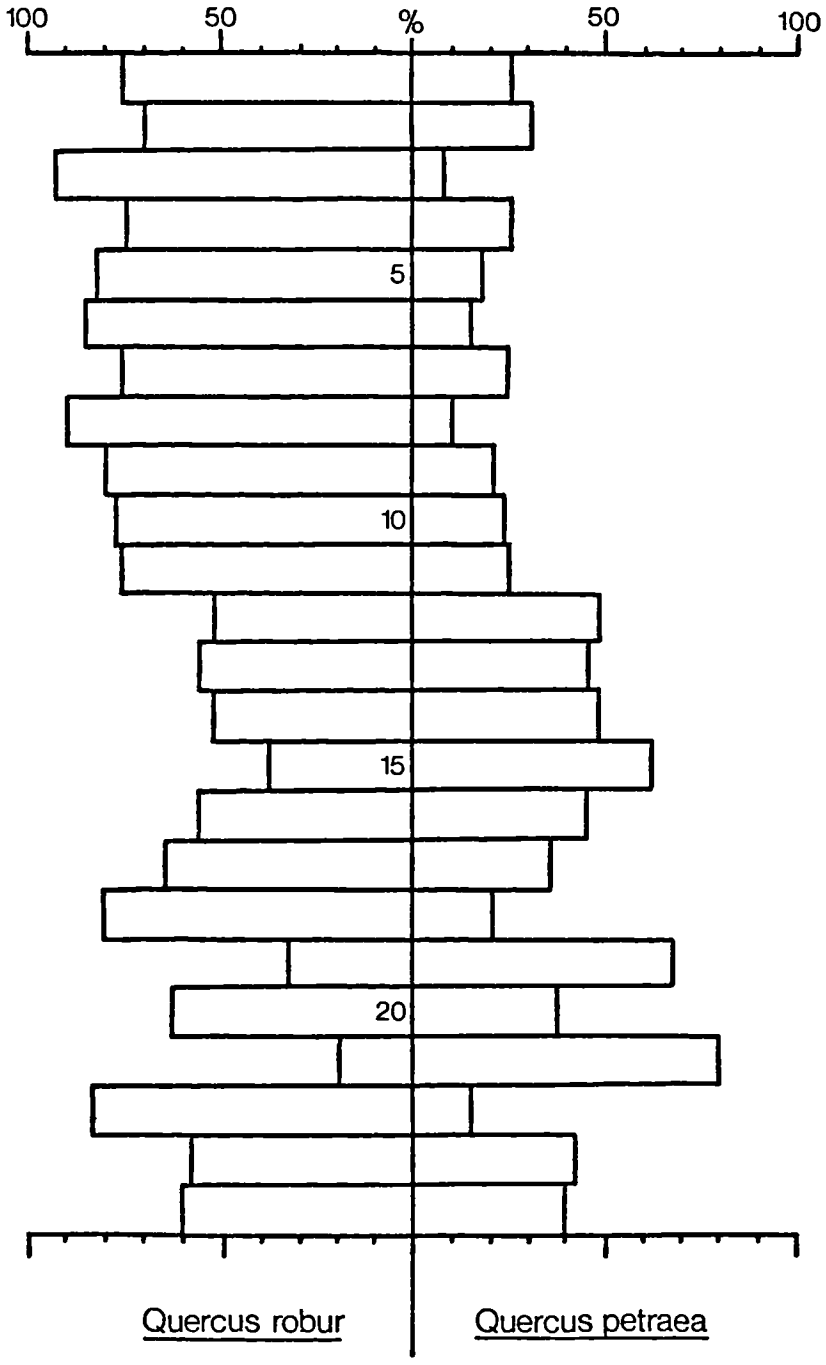
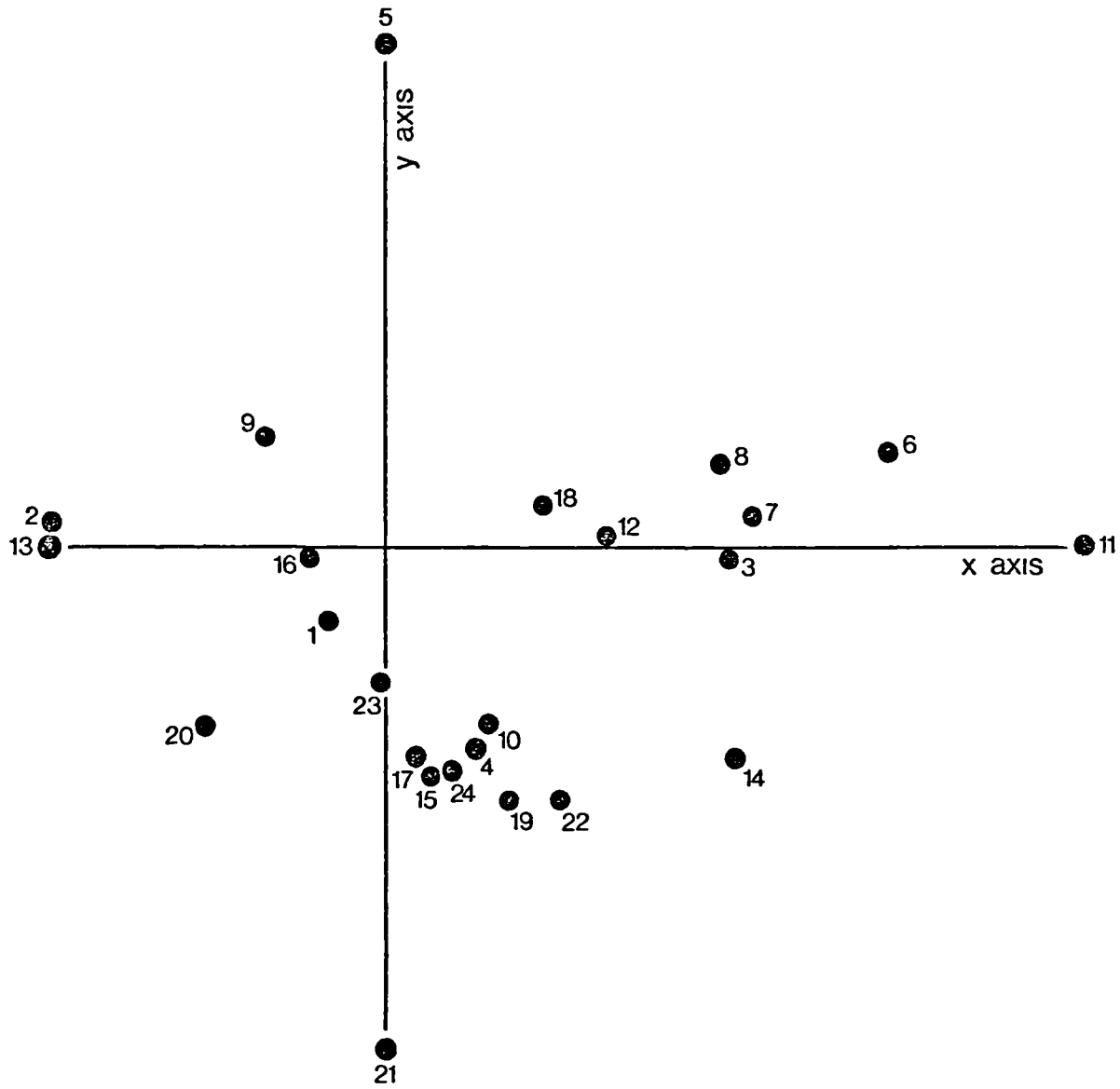


Fig. 55



5. DISCUSSION

Ordination

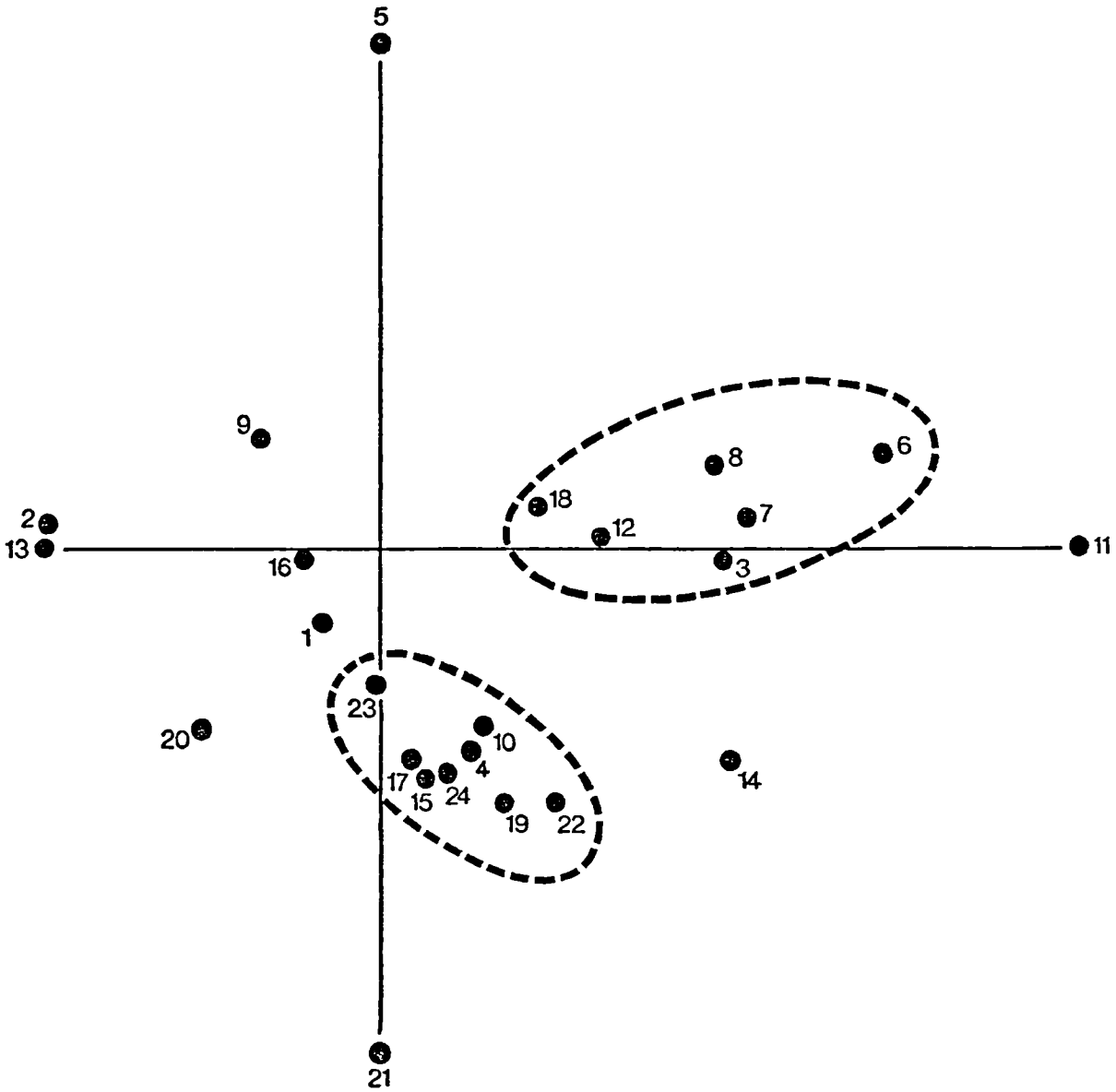
As shown in fig. 56, the ordination reveals two obvious site concentrations. One group contains sites 3, 6, 7, 8, 12 and 18, all old Quercus robur dominated woods. The second contains sites 4, 10, 15, 17, 19, 22 and 23, all Fagus dominated woods.

The x axis, that of maximum variation, is interpretable as a Quercus robur - Quercus petraea axis. This separation is more clearly defined in figs. 57 and 58, which show isolines of Indices of Relative Dominance for the two species, superimposed on the ordination diagram.

The y axis, expressing maximum variance from the first axis, has clearly differentiated the third dominant species, Fagus sylvatica. Fig. 59 shows that the Fagus axis, at right angles to the Quercus axis, has sites 5 and 21 as its reference stands. Site 21, in which Fagus is the dominant species (Rel. Dom. 87%), is separated from the main Fagus group because of the presence of Alnus glutinosa, not recorded at any other site. Site 5 has an Index of Relative Dominance for Fagus of 0.10%. It is differentiated, as was site 21, on species composition, having relatively high values for both species of Betula and the presence of Acer pseudoplatanus not recorded at any other site.

Sites 14 and 20 are intermediate sites with Quercus and Fagus as co-dominants, and their positions in relation to the x axis reflect the fact that the Quercus at site 20 is mainly petraea and at 14 mainly robur.

Fig. 56



Figs 57, 58 & 59 Indices of relative dominance ——— 95 – 100 — — — — 75 – 94 ..... 50 – 74

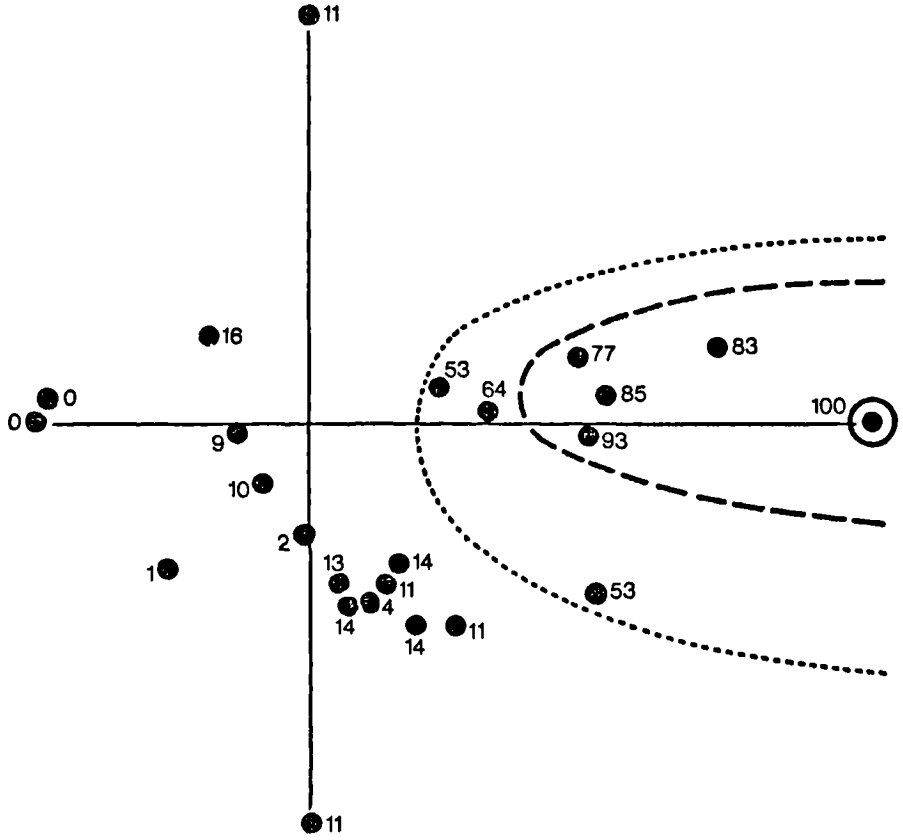


Fig 57 Quercus robur

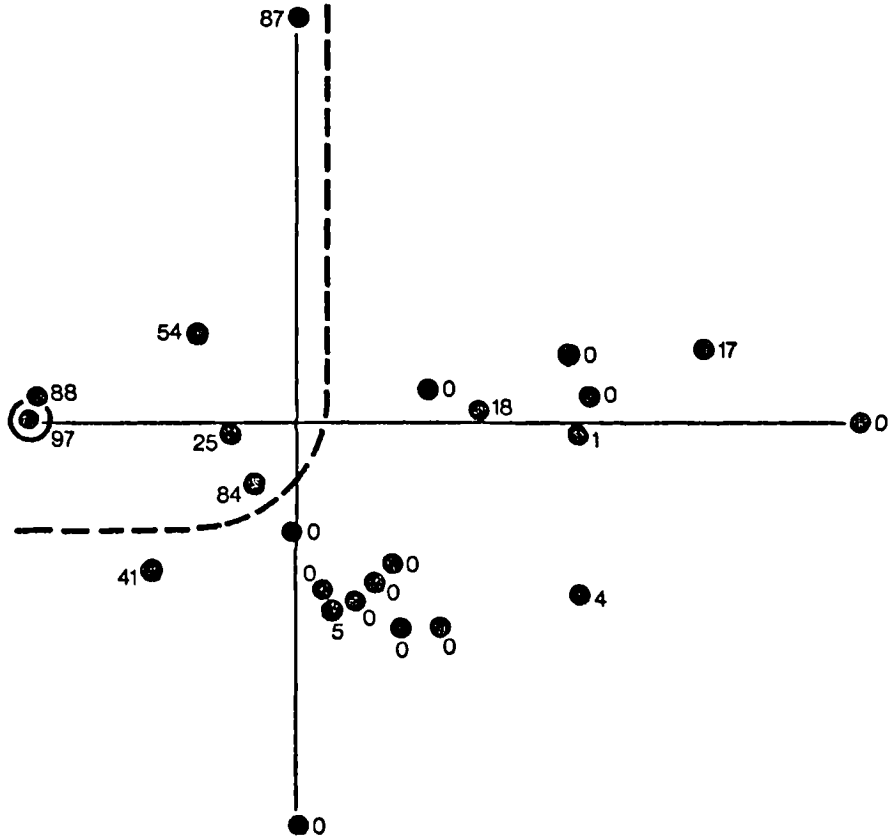


Fig 58 Quercus petraea

Fig 59 Fagus sylvatica

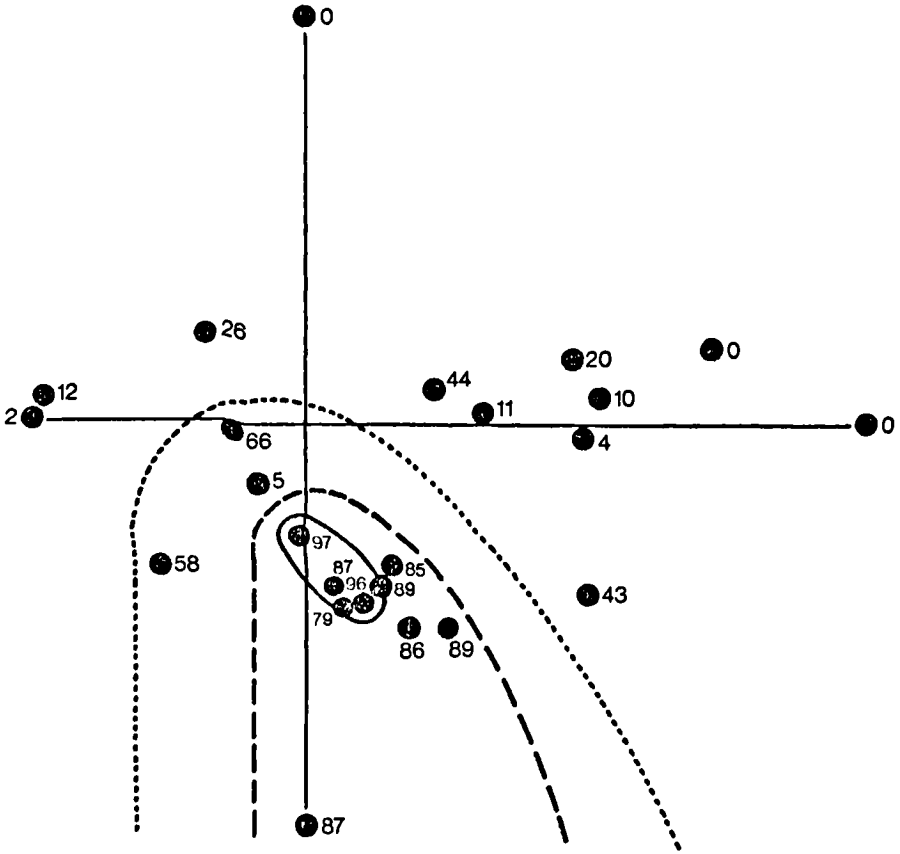
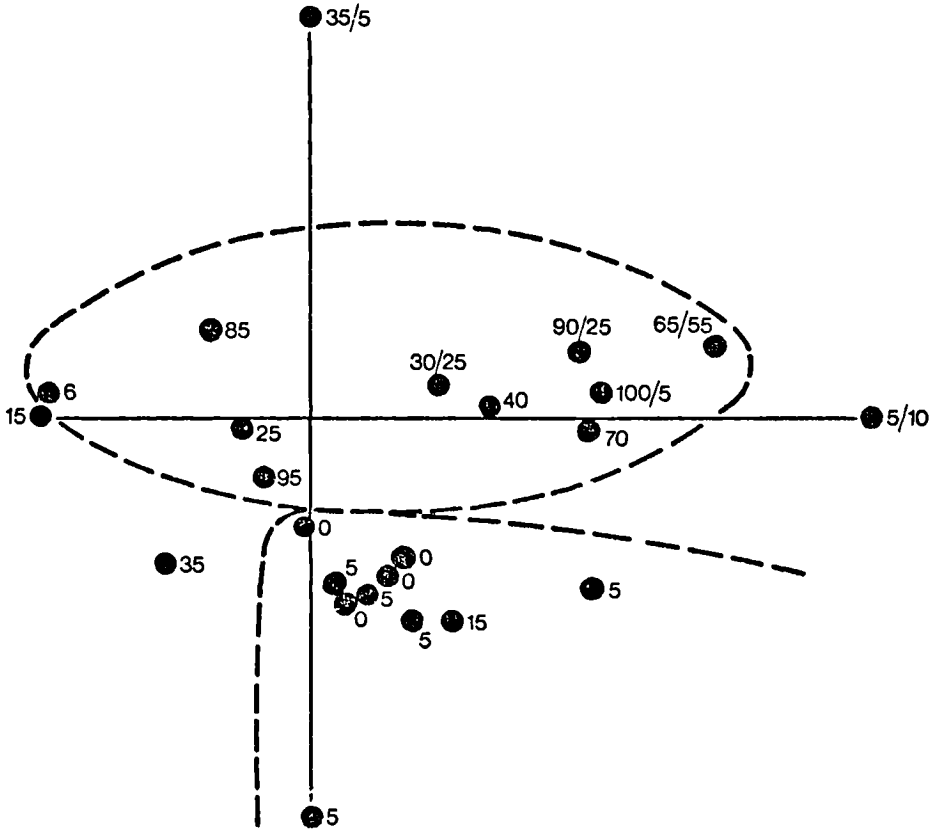


Fig 60 Percentage frequency of Ruscus aculeatus and /Euphorbia amygdaloides (6 sites only)



On the basis of the spatial distribution in fig. 55, the 24 sites can be classified as follows:

1. Woods dominated by Quercus robur. Sites 3, 6, 7, 8 and 12.

2. Woods dominated by Quercus petraea. Sites 1, 2, 5 and 9.

3. Woods dominated by Fagus. Sites 4, 10, 15, 16, 17, 19, 21, 22, 23 and 24.

4. Intermediate woods with high proportions of Quercus and Fagus. Sites 14, 18 and 20.

5. Plantations of known age. Sites 11 and 13.

Oak-dominated woods

The nine oak-dominated woods listed above show considerable structural diversity, in marked contrast to the beech sites. All are dominated by one oak species, the nearest to co-dominance being sites 9 and 12 in which the ratios of petraea to robur are 3.4:1 and 1:3.6 respectively.

Site 1 Sunny Bushes, like Red Shoot (site 5), contains seven tree species, the widest range of any of the 24 sites. However, 1 and 5 have in common only the two oaks and beech, hence their great interstand distance. At site 1 oak species and beech together account for 98.5% of the dominance. From the age profile it can be seen that this is an old wood in which the oldest trees (Q. petraea) are A1-generation. There is a peak in the A2-generation followed by a general decline and little recent oak regeneration, active regeneration within the wood being beech.

Site 2 The imposing closed high canopy of Bramshaw wood is almost

entirely Q. petraea. Fig. 30 shows that the few old trees are A1-generation, but the main canopy is A2-generation. After the peak in girth class 15, oak regeneration falls steadily. The deep shade produced by the very dense canopy has produced conditions unsuitable for oak regeneration and beech is regenerating vigorously through an almost continuous holly shrub layer.

Sites 3 and 8 South Ocknell and Whitley, while differing in species composition, are similar in age structure. In both Q. robur profiles all the regeneration phases, A1, A2, B and C are distinguishable and at site 8 a pre-A1 Q. robur of 5.60m girth was recorded, the biggest at any site. These profiles, also show an overall increase in number with decreasing age. The woods contain many glades and rides and in marked contrast to site 2, the canopy is discontinuous with emergent trees surrounded by younger trees and gaps. (See also fig. 24, p.88, The 125m transect from site 3 also shows the four regeneration phases. This wood is increasing along its western edge at the expense of the adjacent Calluna heath and this edge regeneration is recorded on the transect which started just outside the wood.) Fig. 36 shows the active regeneration at site 8. The structural evidence suggests that these woods have been relatively undisturbed since the 17th century, and the lichenological evidence supports this view. While site 8 is not exceptional, site 3 contains the greatest number of species recorded in any area of comparable size in the Forest, 132 species.

Sites 5 and 6 Red Shoot and Pinnick are the purest oak woods examined, Quercus species accounting for 98.5% and 99.4% of the dominance respectively. Despite this similarity and the fact that they are close together, lying NW and SE of Linford Brook (see fig. 28, p.156)

they are very different. Site 5 is dominated by Q. petraea and has a remarkably even profile with all generations represented. The oldest trees are A1-generation and there is a marked peak in the B-generation. The vital importance of habitat continuity is demonstrated by this continuous oak succession on which a very high lichen count of 122 species has been recorded.

Site 6 in contrast, is dominated by Q. robur, and has no A1-generation, although it does contain two pre-A1 trees, one of which was recorded in the survey. Peaks in the profile lie in the A2 and C-generations, and there seems to have been little regeneration since 1950.

Site 7 South Brinken is dominated by Q. robur which is structurally very similar to site 5. The oldest trees are A1-generation followed by an even representation of all ages down to the B-generation. The B-generation peak is followed by a decline, with no C-generation, but with regeneration active at present. Beech which starts in the A2-generation is present in small numbers throughout. This is the only wood with a relatively large quantity of Field Maple which here achieves an IVI of 52.22.

Site 9 I suggested in Part I that King's Hat may have been the site of the earliest recorded coppices, those at Ramnor. It is isolated in the ordination diagram, a reflection of its differences from other oak woods.

The Indices of Relative Dominance for Q. petraea, Fagus and Q. robur are 54.2, 26.2 and 15.8 and hybrid oak was recorded at this site and nowhere else. It is quite unlike all the other oak woods in having a pronounced peak in the age-profile between the A2 and B-generation, implying that felling and regeneration in this wood ~~was~~ were heaviest

during the 1775-1850 period. The profile is otherwise more or less continuous from the A1-generation to the present where oak and beech are both regenerating.

Site 12 Frame Wood contains fewer tree and shrub species than most of the other oak woods. Moreover it has a truncated age profile which is surprising in view of the fact that this area has a high lichen count of 110 species and is particularly rich in the large foliose lichens of the genus Lobaria. The oak profile begins in the A2-generation, continues at a high level into the 19th century, falls, rises in the B-generation and falls again to a low level thereafter. It is particularly noticeable at this site that beech is absent until the B-generation, since when it has become established, now accounting for a quarter of the trees by number. This absence of the older generations of beech is a further indication that the oak was probably selectively felled, rather than cleared.

From the presence of such a rich lichen flora and from the age evidence it must be inferred that this wood was selectively felled during the 18th and 19th centuries. All trees older than the A2-generation have been removed, but it must have been done gradually enabling the lichen flora to colonize succeeding generations of oak.

The composite age-profile (fig. 53) gives a very different picture from the wood profiles taken individually. Small peaks in the oak profile, marking the pre-A1, A1, A2 and B-generations are discernible, but the overall picture for the old oak woods is one of steady growth in numbers with decreasing age up until the end of the B-generation, i.e. the characteristic pattern of a population maintaining its numbers.

This profile confirms the points made in Part I about the truncation of the oak record in the Forest. There is a clear break between the A1 and Pre-A1-generations, demonstrating that in effect the continuous growth of the Forest as we see it today, dates from the start of the A1-generation. The profile shows three survivors from the age of great 17th century clearance. The steady increase in numbers throughout the Forest from the late 17th century onwards, implies that grazing pressure before the 1851 Deer Removal Act may not have been as detrimental as was thought at the time. In Part I it was shown that felling for the Navy was taking place throughout the 18th century, yet fig. 53 shows continuous regeneration throughout the period. The steadily decreasing regeneration recorded during the early 20th century strongly suggests that the increase in grazing pressure recorded by Peterken and Tubbs (1965, fig. 3) may have been much more destructive than that a century earlier. Fig. 53 agrees very well with their graph of changing grazing pressure, registering a regeneration peak just after the 1851 Act, the time of minimum 19th century grazing pressure. This is followed by a steady decline in regeneration reaching a low in the 1920s (girth class 4) which corresponds to the peak in grazing pressure reached in 1925. Finally fig. 53 shows the rise and levelling off of regeneration resulting from the extremely low grazing pressure during ~~the~~ World War II, and the more recent growth of grazing pressure to its present level, the highest this century.

Some idea of the relative girths of oak and beech of the same age can be gathered from fig. 53. The relative positions of peaks of oak and beech agree with the few ring counts that I have been able to make from beeches. For a given age, the girth of beech exceeds oak by roughly 20-25%.

Fig. 54 shows, by girth class, the percentage for each species, of the total oak recorded (hybrids omitted). It shows that there has been gradual change in favour of Q. robur over the last three hundred years. The density ratio for all classes Q. robur/Q. petraea is 2.2:1 and for the total basal area for all classes 1.5:1. From the evidence available it is not possible to say whether this shift is the result of the preferential felling of Q. robur in the past, the better reproductive capacity of Q. robur in the climatic conditions of recent times, or some other cause.

In the site discussion it was noted that oak regeneration is absent at some sites where beech is regenerating. The work of Gordon (1912), Watt (1923), and Ovington and McRae (1960) has shown the optimum light level for oak to be full day-light, whereas beech seed is viable down to one sixtieth of day-light, with an optimum level considerably below full day-light.

As long as gaps are available in the canopy there will be sites within the wood light enough for oak to regenerate, the situation at sites 3 and 8. It would seem probable that in an uneven-aged canopy with gaps, and where the available seed greatly exceeds the number of available sites, oak may maintain its dominance. However, once an even-aged heavy shade-producing canopy has formed, beech can replace oak through its ability to regenerate at the lower light level. I suggest that this has happened at site 2 (Fig. 30). A2-regeneration at Bramshaw has produced the most impressive high oak canopy in the Forest. However the profile shows how, as the canopy closes and the light level falls, oak regeneration dies out, to be replaced by beech.

I pointed out in Part I, that owing to browsing, the ground flora of the New Forest is very sparse. I suggested therefore that Ruscus aculeatus

and Euphorbia amygdaloides when found together might be an important diagnostic association in old relatively undisturbed oak woods. The frequency of both species was recorded during the random walk. From Fig. 60 it will be seen that Ruscus is found in abundance only in old oak woods and is either absent or present at the 5% level (1 sighting only per site) in all the beech woods. Recorded in brackets on fig. 60 are frequencies of Euphorbia which, with the exception of site 11 (a Q. robur plantation), occurs only in old oak wood where Ruscus is also present. The correlation coefficient between the frequency of Ruscus and the Index of Relative Dominance of Quercus (both species) in uninclosed woods is highly significant: r = +0.87 (.001 level = 0.68). Uninclosed woods in this context excludes the five inclosures in which some degree of disturbance is known to have taken place.

Beech-dominated woods

Site 4 The age-profile for beech at Deazle Corner records peaks from the A1, A2 and B-generations, followed by a sharp drop and a gradual increase in regeneration since 1900. Active Q. robur regeneration is taking place, a feature, discussed below, of several of the beech woods.

Site 10 This is the northern part of Eyeworth Wood, an area of high canopy beech with a continuous holly understorey. The oldest trees are of A2-generation and the rapid increase in beech from class 20 to class 15 suggests regeneration in the area after oak removal. The truncated and inverted oak profile implies complete removal of oak of A2-generation and older, and its replacement by beech. From class 13 oak reganeration falls steadily under the established beech canopy. The considerable disturbance suggested by the age-profile is relected in the relatively poor lichen count of 64 species.

Site 15 Broom Hill is very similar to site 10. The oldest beech are of A2-generation. Beech rises steadily until the B-generation, then falls abruptly. There is one A1-generation Q. petraea, perhaps the sole survivor of the former oak element of the area. There is no documentary reference to this wood, but the profile suggests a similar history to site 10, colonization by beech of an area cleared of oak during the 18th century. Here again the level of disturbance is reflected in the very low lichen count of 22 species.

Site 16 Ocknell Inclosure is known to have been planted unsuccessfully in 1775 (see Part I, p. 83). From fig. 44 a clearer idea of the history of this inclosure can be inferred.

The poor establishment of the 1775 oak sowing in classes 15 and 16 is followed by a complete absence of regeneration, a period when hogs and ponies gained illegal entry to the inclosure. It seems probable that oak classes 17, 18, 19 and beech classes 21, 22 and 23 are trees which pre-date inclosure, confirming the proposal in Part I that the inclosed site was already partly wooded. Not until the late 18th century does intensive regeneration of oak and beech take place, possibly the result of some further management not recorded in the documents. The inclosure was thrown open in 1815, enjoyed further regeneration in the B-generation, then nothing more until the present (c.f. Ocknell Coppice, site 14, discussed below).

Site 17 Woodcrates, one of the old beech woods, is known to have been cleared of oak during the 18th century. This is shown by the profile; only three oaks greater than 2.2m are recorded and there is a steady build up of beech through the period when felling of oak took place. The oldest beech, now beginning to decay, is of A1-generation.

Site 19 Bignell, like site 10, has a very short profile reflecting

its known history. In this wood also, oak timber was felled for the Navy. Unlike site 17 there are no very old beeches present suggesting that the colonization by beech dates from the period of oak removal. Because of the absence of many old beeches this comparatively young wood does not have a closed canopy and oak is regenerating actively. Like site 10 the past disturbance is recorded in the similarly poor lichen count of 71 species.

Site 21 This is a stream valley in Stricknage Wood, an area which is not mentioned in the historical record. It is separated from the other beech woods in fig. 55 because of the presence of Alnus glutinosa not recorded elsewhere. The oldest beech, of A2-generation is followed by peaks at the end of the 18th century and in the B-generation. Vigourous regeneration of oak and beech has taken place since World War II. The one old beech recorded in this area carries an extraordinarily rich lichen flora, and the complete absence of any A1 or A2-generation oaks suggests habitat continuity has been maintained by beech at this site. Despite the scarcity of old beeches (the total basal area for beech is less than half that of some of the older beech woods) there must have been unbroken continuity of habitat as the site has a very high lichen count of 115 species, the beeches being particularly rich in foliose lichens of the genera Lobaria and Peltigera.

Site 22, 23 and 24 Little Stubby Hat, Wooson's Hill and Rushpole are, like site 17, woods which had either recently been cleared of oak for the Navy or were mixed oak and beech at the time of the 1787 survey. Without this historical evidence the age profiles might suggest that they were pure beech in the 18th century. In all three, oak is almost absent before the end of the 19th century. In all these woods the unbroken continuity of beech has provided sites for the very

rich floras found within them, lichen counts of 122, 125 and 127 species respectively. In all three woods the oldest trees, of Al-generation age are decaying and collapsing and in these open conditions active regeneration of beech and oak is taking place. At site 22 there are only a few old beeches standing; the great number of young oak and beech give a total basal area for the site of only 13 sq.m.

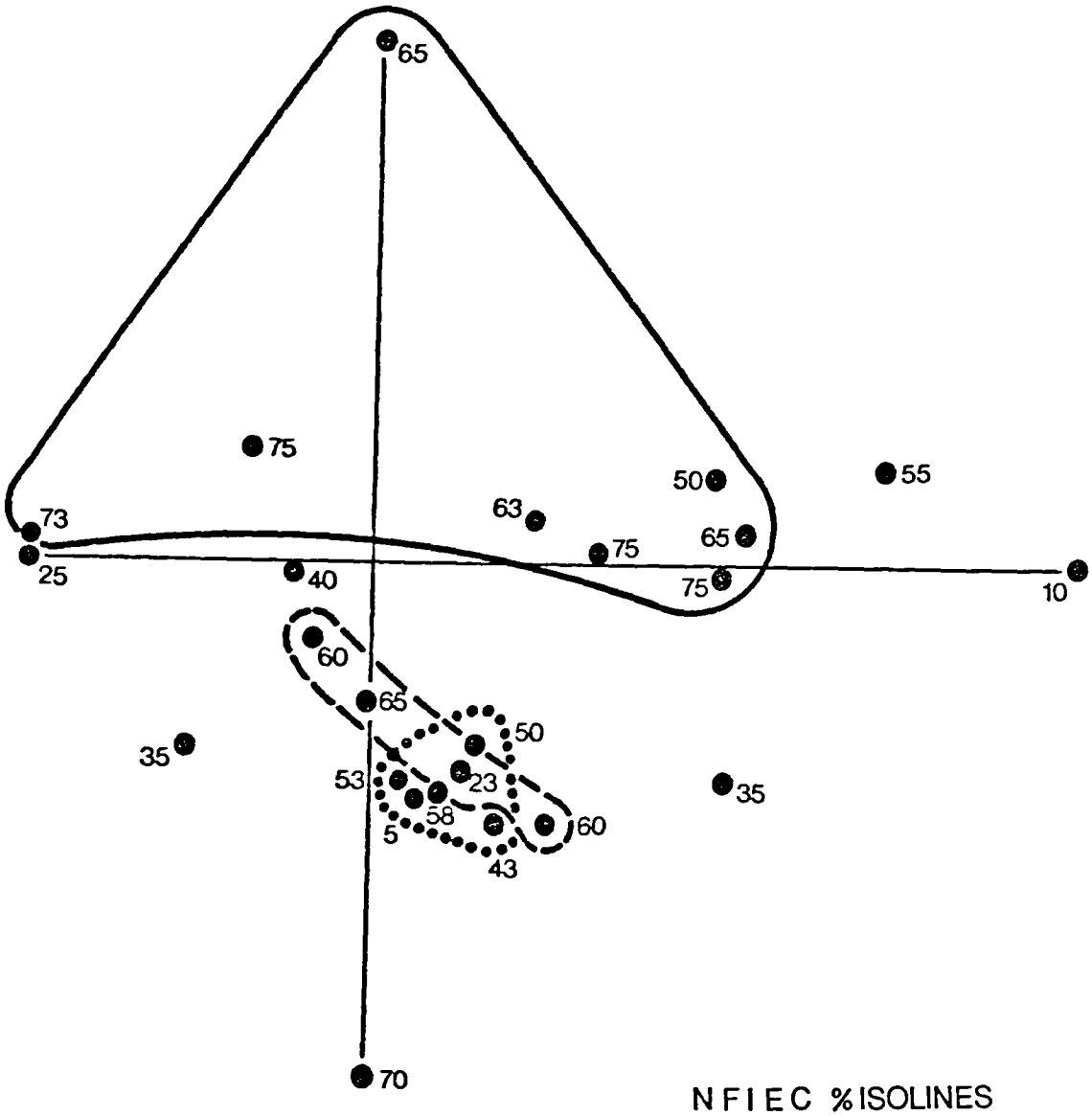
The beech-dominated woods display several striking characteristics. Their high levels of association in the ordination are a reflection of their lack of floristic diversity compared to the oak woods.

In Part I evidence was presented of the preferential felling of oak for the Navy, giving beech a steadily increasing colonizing advantage during the 18th and 19th centuries. Felling policy has in this way brought about a simplification of the habitat in many woods, visible not only in their increased similarity, but in the falling Index of Ecological Continuity shown in fig. 61. The highest levels almost all occur in the diverse oak woods. Old beech woods from which oak has been removed, e.g. sites 17 and 24, fall in the 50-60% range, and secondary beech woods, where more drastic clearance has taken place in the past, have still lower levels, e.g. sites 15 and 19.

There is further evidence of the steady change from oak to beech in the ratios obtained from the Timber Surveys discussed in Part I. In 1764 the ratio of the numbers of oak (both species) to beech was 2.8:1, in 1783 2.2:1, and today it is 1.07:1. The present total basal area ratio is 1.1:1.

One obvious result of this heavy clearance is the absence of old oak in any of the beech woods; with the exception of site 16, oak in all

Fig.61


65
75
50
55
73
63
65
75
25
40
75
10
60
65
50
35
53
23
35
58
5
60
43
70
N F I E C % ISOLINES
>65
55-64
<54

the woods appears to date from around 1775. It is important to note that at sites 17 and 22, beech has been an important and perhaps dominant species for over 400 years. Taverner's 1565 survey describes Woodcrates as "most part beech and some oak", Little Stubby Hat as "set with beeches" (see Appendix 4). In these woods, and probably Rushpole about which the survey is less specific, beech has been present continuously, providing habitats for the relatively rich lichen floras which have survived.

As mentioned above, the oldest beeches at sites 4, 17, 23 and 24 are decaying, which puts the age limit for most beech in the Forest at around 300 years, the figure suggested in Part I. The way in which oak (Q. robur in all cases) is re-establishing itself in the oldest beech woods gives support to the view that the present dominance of beech in these woods is the result of natural processes responding to the actions of man.

In many of the oak and beech woods a small number of Yew and Rowan have been recorded. In no woods in the Forest is there a large representation of either species, unless planted. The explanation would seem to be the palatability of seedlings. In many woods, in summer and autumn, first year seedlings of both species are a common sight but few ever survive the browsing of the ubiquitous ponies.

Intermediate Woods

Sites 14, 18 and 20

Site 14 is within the 1573 coppice bank, which occupies the southern part of Ocknell Inclosure. Site 16 lies to the NW of site 14 (see fig. 28). In Part I section 4, the many references in the documents

to Ocknell coppice are listed. In 1660 the coppice was said to be prospering and the wood decaying. This reference to the condition of the coppice in 1660 explains the truncated profile in fig. 42. At the time of inclosure the coppice area must have been completely cleared, leaving no pre-inclosure trees as at site 16. It seems likely, from the profile, that both areas were planted in 1775. The same initial rise in numbers, followed by a distinct gap, appears in both profiles. One very obvious physical difference is in the openness of the canopy. Site 16 contains some emergent A1 trees and a greater mean distance of 9.6m against 8.0m at site 14. The very even-aged canopy at site 14, approximately 150 years old, seems to have inhibited any oak regeneration, while there is regeneration in the more open conditions at site 16.

Beech, in contrast to oak, has continued to regenerate at this site and now exactly equals oak in numbers and almost equals it in total basal area.

The fact that the oak at site 14 is all Q. robur and that it only appears in the site 16 profile in class 16 could indicate that Q. robur was the species planted. This would certainly accord with the known preference of Foresters in the 18th century. In that case the Q. petraea element at site 16 may have regenerated from the trees on the site before inclosure.

The suggestion that continuity of habitat was broken at site 14 around 1775, is supported by the lower lichen count (see data sheets), and lower frequency of Ruscus aculeatus 5% against 25% at site 16.

Site 18 Burley Old Inclosure, like site 16, was formed in a previously wooded area (see Part I, section 4, p. 76). There are

today only a few trees pre-dating inclosure left (see class 20). The effect of inclosure on the area can be seen in the rapid expansion of oak (class 17 and 18) and the beginning of the beech expansion which continues up to the B-generation. The implication that this may have been predominantely oak before inclosure is consistent with Thomas Hurst's list in 1615, which records this general area as having provided the greatest number of timber oaks in the bailiwick.

On the map of 1875 it is shown as having been thrown open, but no date is given. In fig. 46 oak regeneration stops abruptly at class 12 or around the turn of the century, possibly 1815, the date when several other inclosures including Ocknell, were thrown open. The effect of the known reinclosure of Burley Old in the 19th century can also be seen. It is noteworthy that beech continued to flourish after disinclosure.

There are a few Quercus cerris at site 18, probably carried in from surrounding areas where this species has been planted.

Site 20 Great Wood contains several areas of relatively undisturbed old oak wood and within the whole wood 120 lichen species have been recorded (Rose and James 1974). The study area was chosen because of its obvious structural differences from the surrounding areas. The age profile strongly suggests that the area was cleared at some time in the early 18th century. The oldest generation of oak and beech appear to be of the same age and the oak, almost pure Q. petraea, is mainly even-aged (see girth classes 13, 14 and 15, fig. 48). This contrasts with other parts of Great Wood which are dominated by Q. robur. The obvious secondary nature of this site is confirmed by the low lichen species count of 42.

Plantations

Site 11 This large plantation was formed in 1815 by the inclosure of land much of which was previously heath. The total number of lichen species which have colonized this plantation is only 38.

Site 13 This old coppice site was cleared and replanted with Q. petraea in 1700. Active regeneration is taking place in areas from which the mature timber has recently been removed. The serious disruption caused by clearing and replanting is reflected in the relatively poor lichen count of 49 species.

6. CONCLUSION

The empiric findings in Part II support many of the hypotheses derived from the historical material in Part I.

The earliest reference to the management of coppices for the production of timber and underwood comes from the end of the 15th century. By 1600, the rise in the price of timber in response to increasing demand, and the fall in the price of underwood, had made coppicing uneconomic. So-called coppices were managed during the 17th century for the exclusive production of oak, and by 1700 somewhere between 2,000 and 3,000 acres of the most suitable land in the Forest had experienced some form of management. At the same time the rate of oak extraction was rising steadily, and by 1673 had probably reached an annual figure of at least 3,000 tons, more than the Forest could provide on a continuous basis. This period of heavy felling was followed by the first widespread regeneration phase in the late 17th century, the origin of the oldest generation of oak found widely in the uninclosed woods today. An important by-product of this felling phase was a marked increase in the beech population in many woods. In the first

half of the 18th century another period of oak felling for the Navy was followed by further regeneration and a second and more pronounced phase of beech expansion. (Both phases of beech expansion appear in the pollen record.) These phases of oak felling have left their mark on the woods in the form of clearly detectable stratification of age structure, and a steady change in the ratio of oak to beech from 3:1 around 1700, to 1:1 today.

The primary and secondary woods show not only characteristic differences in canopy structure, but also the presence or absence of important diagnostic associations of ground plants and epiphytic lichens.

The importance of man as the overriding factor in the development of the woods is demonstrated by the absence of any correspondence between woodland type and soil type.

At times it has been suggested that parts of the Forest are dying through lack of regeneration. The age profiles in Part II show, to the contrary, that provided the grazing pressure does not exceed the critical level as defined by Peterken and Tubbs (1965), the Forest is quite capable of perpetuating itself.

The details of past management now available make clear the ways in which it might be possible gradually to recreate medieval conditions in parts of the Forest. It should be borne in mind however, that such conditions were as much the result of human decision as those today which we might wish to replace.

An alternative is reversion to a still earlier phase, by the reintroduction of those species which have largely or completely

disappeared through the ages: elm, wild service, lime, hazel and hornbeam.

Recent changes in the Forest, like the spread of Scots Pine since its reintroduction in 1775, must be seen not as alien intrusions into an otherwise natural world, but as the latest in a succession of economic decisions initiated by prehistoric man.

"A man is rich in proportion to the number of things which he can afford to let alone."

David Thoreau: Walden

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